

Chapter 11

Materiel System Research, Development, And Acquisition Management

“We must ensure that our warfighters have the capabilities they need to accomplish the Nation’s military demands in this new and emerging global environment...We must develop, acquire, and sustain key military capabilities that enable us to prevail over current challenges and to hedge against, dissuade, or prevail over future threats...The world situation demands an Army that is strategically responsive and dominant at every point on the spectrum of military operations. We are working hard to ensure that America’s soldiers continue to be the best trained, best led, and best equipped land force on earth.”

Claude M. Bolton, Jr., Assistant Secretary of the Army (Acquisition, Logistics, and Technology)

Section I
Introduction

11–1. Department of Defense (DOD) and U.S. Army Management System.

This chapter describes the DOD and U.S. Army Management System used for the research, development, and acquisition (RDA) of materiel systems, MDAPs, major and non-major programs. The RDA management system can be viewed simply as a combination of structure, process, and culture.

- Structure is the sum of the guidance provided by law, policy, regulation or objective, and the organization provided to accomplish the RDA function.
- Process is the interaction of the structure in producing the output.
- Culture is the cumulative sum of past practices and their impact on interpretation of guidance and attitude toward institutional changes to the system.

11–2. System focus.

For the Army, the focus of materiel acquisition management output is producing military units that are adequately trained, equipped, and maintained to execute NMS effectively. The focus of the RDA management system is the development and acquisition of systems that are affordable and support the enforcement of our NMS. The RDA management system is a fully coordinated effort concerned with the total fielding of a system and encompasses the elements of system acquisition (Table 11–1). To facilitate an understanding of the process, this chapter will begin by highlighting some of the critical aspects of structure.

Table 11–1
Systems Acquisition Management Individual Element

System	Acquisition	Management
Hardware	Determine Need	Plan
Software	Design	Organize
Logistic Support	Develop	Staff
Manuals	Test	Control
Organizations	Produce	Lead
Doctrine	Field	
Facilities	Support	
Personnel	Improve	
Training	Replace	
Spares	Dispose	

Section II
DOD organization and management

11–3. DOD policy

a. The basic policy is to ensure that acquisition of defense systems is conducted efficiently and effectively in order to achieve operational objectives of the U.S. Armed Forces in their support of national policies and objectives within the guidelines of the *Office of Management and Budget (OMB) Circular A–11, part 3: Major System Acquisitions. DOD Directive 5000.1: The Defense Acquisition System, DOD Instruction 5000.2: Operation of the Defense Acquisition System*, January 2003, and a guidebook containing additional supporting discretionary, best practices, lessons learned, and expectations posted to the DOD 5000 Resource Center at <http://DOD5000.dau.mil> are the documents that

provide the DOD guidance for system acquisition policy and procedure. These documents establish an integrated management framework for a single, standardized DOD-wide acquisition system that applies to all programs including highly sensitive, classified programs. Within the DOD system there are three acquisition program-size categories with decision authority placed at the lowest practical level. The system is characterized by three activities, four phases, eight work efforts, and three milestones (discussed later in the chapter) which track a DOD program's progress throughout its development and program life. "Tailoring" is encouraged in the process to reflect specific program needs. In accordance with *DODD 5000.1* "One size does not fit all." The essential features of the DOD materiel acquisition system are:

- a clear Acquisition Strategy (AS),
- a thorough program plan,
- risk management techniques, and
- systematic program tracking against the plan.

b. An acquisition program is defined as a directed, funded effort designed to provide a new, improved or continuing weapon system or IT system capability in response to a validated operational need. Acquisition programs are divided into different acquisition categories (ACATs), which are established to facilitate decentralized decision-making, and execution and compliance with statutory and regulatory requirements. Acquisition phases provide a logical means of progressively translating broadly stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. All tasks and activities needed to bring the program to the next milestone occur during acquisition phases. A milestone is the major decision point that initiates the next phase of an acquisition program. MDAP milestones may include, for example, the decisions to begin concept and technology development, or to begin low-rate initial production (LRIP).

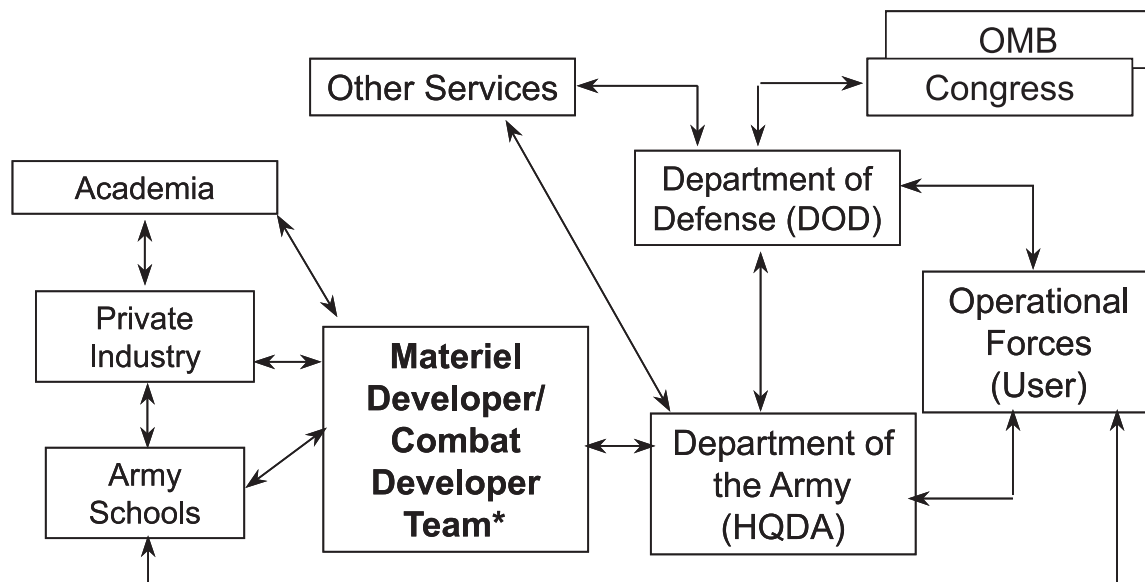
11-4. DOD acquisition management

a. The Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) is the senior procurement executive and the principal staff assistant and adviser to the Secretary of Defense (SECDEF) and takes precedence in DOD for all matters relating to the materiel acquisition system: R&D, developmental test (DT) and evaluation, production, logistics; command, control, and communications, and intelligence activities related to acquisition; MILCON; and procurement.

b. The USD(AT&L) serves as the Defense Acquisition Executive (DAE) with responsibility for supervising the performance of the entire DOD acquisition system in accordance with the laws, Congressional guidance and direction, and *OMB Circular No. A-11, part 3*. The DAE establishes policy for all elements of DOD for acquisition. The basic policies of the DAE are established and implemented by *DODD 5000.1* and *DODI 5000.2*. The DAE also serves as the chairman of the DAB, assisted by overarching integrated product teams (OIPT) (see para 11-67) that relate to the acquisition process. As DAB chairman, the DAE makes recommendations to the SECDEF on acquisition resource matters and other acquisition management matters required to implement acquisition milestone decisions. A clear distinction exists between responsibility for weapon systems acquisition and budgetary authority. While the DAE, as DAB chairman, makes recommendations on whether to proceed with plans to acquire major materiel systems, the DRB, chaired by the (DepSecDef), makes budgetary recommendations on the same programs. Acquisition programs must operate within the parameters established by the DRB and the SECDEF through the PPBS process.

11-5. Organizational linkage

The managerial process of transforming a materiel requirement into a fielded and supported system consisting of hardware, software, and personnel is conducted by various organizational structures in DOD and the Services responsible for RDA. Figure 11-1 shows the primary elements involved for the Army, including the linkage between the defense community, industry, and academia. The arrows in the figure depict the flow of business in the process of this transformation.



* Materiel Developer includes Program Executive Officers (PEOs); Program, Project, Product Managers (PMs); and the U.S. Army Materiel Command (AMC). The Army's primary Combat Developer is U.S. Army Training and Doctrine Command (TRADOC). TRADOC Battle Labs, Integrated Concept Teams (ICTs), and Integrated Product Teams (IPTs) support the MATDEV/CBTDEV Team.

Figure 11–1. Organizational linkage for Army materiel acquisition

11–6. DOD Science and Technology (S&T)

Since World War II, owning the technology advantage has been a cornerstone of our NMS. Technologies like radar, jet engines, nuclear weapons, night vision, global positioning, smart weapons, and stealth have changed warfare dramatically. Maintaining this technological edge has become even more important as U.S. force structure decreases and high technology weapons become readily available on the world market. In this new environment, it is imperative that U.S. forces possess technological superiority to ensure success and minimize casualties across the broad spectrum of engagements. The technological advantage enjoyed by the United States in Operation Desert Storm in 1991, and still enjoyed today, is the legacy of decades of wise investments in S&T. Similarly, our warfighting capabilities 10 to 15 years from now will be substantially determined by today's investment in S&T.

11–7. Defense Science and Technology Strategy

The Defense Science and Technology Strategy (DSTS) is supported by the DOD Basic Research Plan (BRP), DOD Joint Warfighting Science and Technology Plan (JWSTP), Defense Technology Area Plan (DTAP), and Defense Technology Objectives (DTO) of the JWSTP and DTAP. The strategy provides DOD's S&T vision, plan, and a statement of objectives for the planners, programmers, and implementers. These documents, and the supporting individual S&T master plans of the Services and defense agencies, guide the annual preparation of the DOD S&T budget and program objective memoranda (POM).

a. The BRP presents the DOD objectives and investment strategy for DOD-sponsored Basic Research (6.1) performed by universities, industry, and Service laboratories. In addition to presenting the planned investment in 12 technical discussion areas, the current plan highlights six strategic research areas holding great promise for enabling breakthrough technologies for military capabilities well into the 21st century.

b. The *Joint Warfighting Science and Technology Plan (JWSTP)* objective is to ensure the S&T program supports priority future joint warfighting capabilities. The *JWSTP* looks horizontally across the Services and agencies, and together with the *DTAP*, ensures the near-, mid-, and far-term joint warfighter requirements are properly balanced and supported in the DOD S&T planning, programming, budgeting, and assessment activities. The *JWSTP* is focused on 13 Joint Warfighting Capability Objectives (JWCO). These objectives support the JROC, the Joint Warfighting Capabilities Assessment (JWCA) process, and the four leveraged concepts emphasized in Joint Vision: dominant maneuver, precision engagement, full-dimension protection, and focused logistics. The *JWSTP* is issued annually as defense

How the Army Runs

guidance. Advanced concepts and technologies identified as enhancing high priority joint warfighting capabilities, along with prerequisite research, receive funding priority in the President's Budget (PB) and accompanying FYDP.

c. The *DOD Technology Area Plan (DTAP)* presents the DOD objectives and the Applied Research (6.2 funds) and Advanced Technology Development (6.3 funds) investment strategy for 12 technology areas critical to DOD acquisition. The plan takes a horizontal perspective across Service and agency efforts, thereby charting the total DOD-wide investment for each technology area. The DTAP documents the focus, content, and principal objectives of the overall DOD S&T efforts.

d. *Defense Technology Objectives (DTO)*. The focus of the S&T investment is enhanced and guided through DTOs. Each DTO identifies a specific technology advancement that will be developed or demonstrated, the anticipated date of technology availability, and the specific benefits resulting from the technology advance. These benefits not only include increased military operational capabilities but also address other important areas, including affordability and dual-use applications that have received special emphasis in the *Defense Science and Technology Strategy*. Each DTO also identifies funding required to achieve the new capability. Over seventy percent of the DTOs are identified and described in the DTAP, which cites the anticipated return on the S&T investment through 12 broad technology areas. The remaining DTOs support the 13 JWCOs of the *DOD Joint Warfighting Science and Technology Plan (JWSTP)* (see par. 11-7b).

11-8. Defense Advanced Research Projects Agency (DARPA)

DARPA is a unique SECDEF management tool. It consists of a mix of military and civilian scientists and engineers, and has a broad charter to conduct advanced research that fills R&D gaps between Service lines of responsibility or handles high priority problems that cross Service lines. DARPA is charged with the maintaining leadership in forefront areas of technology so DOD can be aware as soon as possible of developments with potential military significance. DARPA's purpose is to review ongoing R&D, determine whether or not the concept is feasible, determine its usefulness, and transfer it (the technology) to the appropriate Service. DARPA does not have its own in-house research facilities and therefore relies on the Services and other Government agencies for technical and administrative support. Once a decision to support a research proposal is made, contracting responsibility is generally assigned to one of the Services.

11-9. Defense Acquisition University (DAU)

The Defense Acquisition University is a corporate university that includes the Defense Systems Management College (DSMC). The DAU operations and structure is designed to be similar to a state university with many campuses, each specializing in certain acquisition disciplines. The *Defense Acquisition Workforce Improvement Act (DAWIA)* required the formation of DAU, with operation commencing in 1992. DAWIA also required DOD to establish a senior course for personnel serving in critical acquisition positions (CAP) on a level equivalent to existing senior professional military education programs. The USD(AT&L) has oversight authority for the acquisition curriculum of the course, which is taught at the Industrial College of the Armed Forces (ICAF) of the National Defense University.

11-10. Defense Systems Management College (DSMC)

The DSMC is the USD(AT&L) institution offering military and civilian professionals up-to-date training focused on managing materiel acquisition programs in DOD. One such course is the Advanced Program Management Course (APMC), a required 14-week course for individuals seeking Level III certification in the Program Management ACF. The DSMC, founded 1971, is a joint military professional institution, operating under the direction of the DAU Executive Board, to support acquisition management as described in *DOD Directive 5000.1*, and to assist in fulfilling education and training requirements set out in appropriate DOD directives and public laws. The mission of the DSMC is to:

- a. Conduct advanced courses of study in defense acquisition management as the primary function of the college.
- b. Conduct research and special studies in defense acquisition management.
- c. Assemble and disseminate information concerning new policies, methods, and practices in defense acquisition management.
- d. Provide consulting services in defense acquisition management.

Section III

Army organization and management

11-11. Army's RDA Goals

a. The SECARMY is responsible for functions necessary for the research, development, logistical support and maintenance, preparedness, operation, and effectiveness of the Army. The SA is also required to provide supervision for all matters relating to Army procurement. The SA executes his acquisition management responsibilities through the AAE.

b. The SA, in support of DOD, places special emphasis on medium and long-range materiel planning, product modification, and service life extension programs. Major state-of-the-art advancements are sought only in carefully

selected areas. Stability in materiel acquisition programs is a matter of utmost interest, especially after the system passes the system development and demonstration milestone decision. Reliability, availability, and maintainability (RAM) goals; manpower and personnel integration (MANPRINT) (see para 11–76d); integrated logistics support (ILS); and objectives related to survivability; effectiveness; safety; and product quality are incorporated into system performance objectives. Contractual incentives to improve RAM and ILS are encouraged.

11–12. Army Acquisition Executive (AAE)

The ASA(ALT) is the AAE. The AAE is designated by the SECARMY as the Component Acquisition Executive (CAE) and the senior procurement executive within DA. He is the principal ARSTAF official for the execution of the AAE responsibilities. The AAE is assisted by a military deputy (MILDEP).

a. The MILDEP is assigned to the Office of the ASA (ALT) and provides staff support to the AAE to manage the research development, DT, and the acquisition of materiel for all Army major weapon and support systems. The AAE has delegated his authority and responsibilities as the Army's Director, Acquisition Career Management (DACM) to the MILDEP. DACM responsibilities include managing the Army Acquisition Corps (AAC) and implementing the acquisition career management requirements set forth in the *DAWIA* legislation. Figure 11–2 depicts the staff relationships in the AAE office.

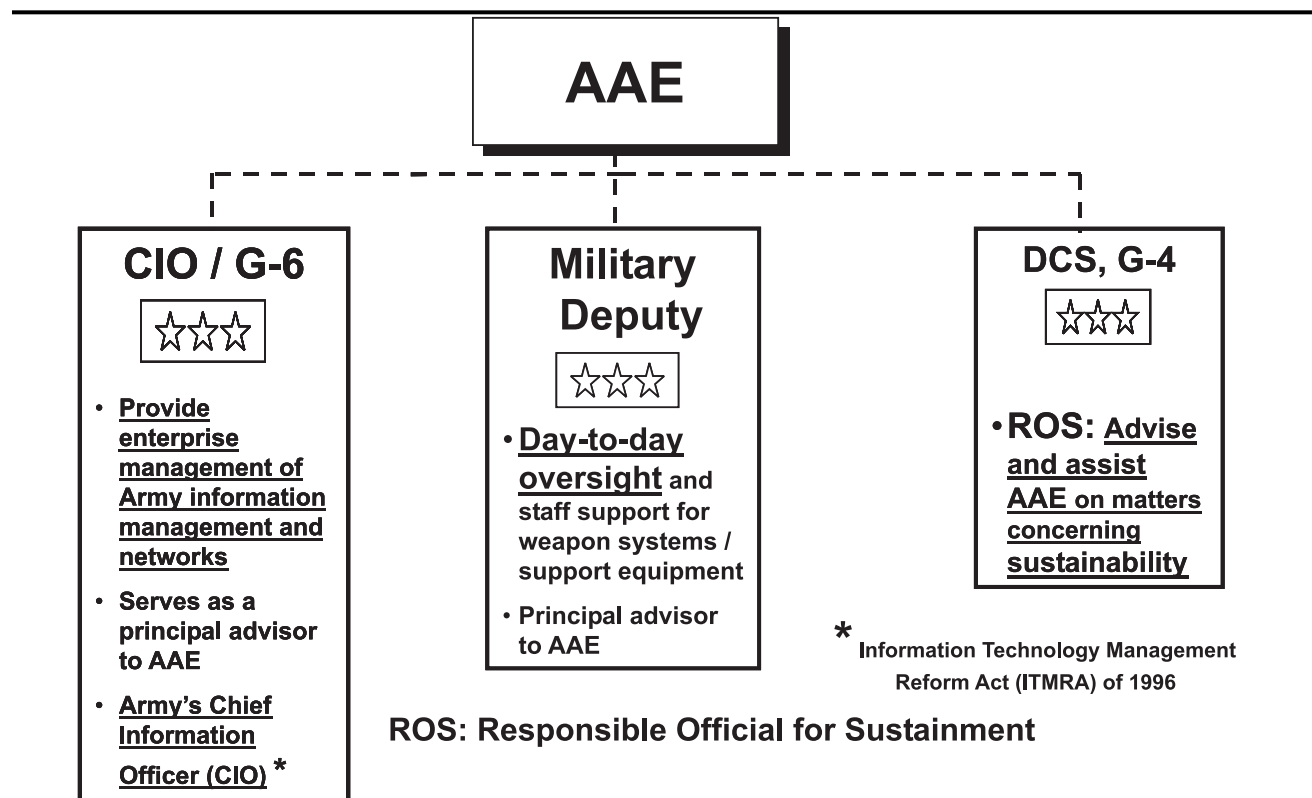


Figure 11–2. Army acquisition executive (AAE)

b. Similar to the DAE, the AAE develops Army acquisition policies and procedures and manages the Army's production base support and industrial mobilization programs. Acting with the full authority of the SA, the AAE is responsible for administering acquisition programs according to DOD policies and guidelines, and exercises the powers and discharges the Component Acquisition Executive (CAE) responsibilities set forth in *DODD 5000.1*. In addition, the AAE will:

- (1) Appoint, manage, and evaluate PEOs and direct-reporting program, project, or product managers (PMs).
- (2) Coordinate with the Office of the Deputy Chief of Staff, G–3 (ODCS, G–3) to establish policy and guidance for analysis of alternatives; for ACAT I and II programs, designate the organization responsible for performing system engineering trade-off analyses for the AoA; and provide issues and alternatives to ODCS, G–3 for inclusion in the AoA tasking document. ACATs are described in figures 11–3a and 11–3b.

Major Defense Acquisition Programs (MDAPs)

Program Category

Primary Criteria

\$ = FY00 Constant

Title 10
Sect #2430

ACAT I *

ACAT ID

RDTE > \$365M or
PROC > \$2.19B
(PEO / PM Managed)

ACAT IC

ACAT IA (12)

ACAT IAM

FY Program Costs > \$32M or
Total Program Costs > \$126M or
Total Life-Cycle Costs > \$378M
(PEO / PM Managed)

ACAT IAC

Technology Transition
Mechanisms to MS B

* Acquisition Information Management (AIM) Database

Pre ACAT Technology Projects

- ACTDs: Advanced Concept Technology Demonstrations
- ATDs: Advanced Technology Demonstrations
- JWEs: Joint Warfighting Experiments

C: Component
D: Defense Acquisition Board
IAM: Major Automated Information System

Figure 11–3A. Acquisition categories (ACATS)

Major Systems

Program Category

Primary Criteria

\$ = FY00 Constant

ACAT II

ACAT II

RDTE > \$140M or
PROC > \$660M

Non - Major Systems

ACAT III

ACAT III

All acquisition programs that are not
classified as an MDAP or Major System
(ACAT I or II)
(Includes less than major AISs)

NOTE: The Acquisition category "IV" has been de facto eliminated by DA program restructuring. "Effective October 26, 2001 ...all Army acquisition programs, regardless of Acquisition Category, will be managed by a ...(PM)..."

*----Dr. Oscar, Memo - Life Cycle Management -- Program Restructuring,
26 October 2001*

Prior to October 26, management by a PM was the sole distinction between an ACAT III program (PM managed) and an ACAT IV program (non-PM managed).

Figure 11–3B. Acquisition categories (ACATS)- continued

- (3) Carry out all powers, functions, and duties of the SA with respect to the acquisition work force within the Army, subject to the authority, direction, and control of the SA.
- (4) In coordination with the ODCS, G-3, develop guidance and serve as co-proponent for the Army's RDA Plan.
- (5) Formulate Army-wide S&T base strategy, policy, guidance, and planning.
- (6) Establish and validate Army technology base priorities throughout the planning, programming, budget, execution system (PPBES).
- (7) Approve and resource Army advanced technology demonstrations (ATDs) and the advanced concepts and technology II (ACT II) program.
- (8) Act as the final authority for all matters affecting the Army's acquisition system, except as limited by statute or higher-level regulation.
- (9) Develop and promulgate acquisition, procurement, and contracting policies and procedures.
- (10) Chair all Army System Acquisition Review Council (ASARC) meetings.
- (11) Direct the Army Science Board (ASB).
- (12) Appoint the source selection authority (SSA) for specified programs. The Federal Acquisition Regulation (FAR) is the primary contracting regulation. It is the first regulatory source to which DA acquisition personnel refer. The ASA(ALT) issues the Army Federal Acquisition Regulation Supplement (AFARS) to implement and supplement the FAR and the Defense Federal Acquisition Regulation Supplement (DFARS) to establish uniform policies and procedures for use in the Army, consistent with DOD regulations.
- (13) Review and approve, for ACAT ID programs, the Army position at each decision milestone before the DAB review. This includes the review and approval of APBs. The AAE also serves as the MDA for ACAT IC and II programs, and assigns the MDA for ACAT III programs to PEOs. The MDA is the individual designated to approve entry into the next acquisition phase.
- (14) Approve the establishment and termination of all program management offices (PMOs) and PEOs. The AAE also has authority to designate a system for intensive, centralized management and to prescribe the appropriate level of management at any point in the program management process.

c. Department of Army System Coordinator (DASC). The DASC is the primary acquisition staff officer at DA. The DASC is responsible for the day-to-day support of his/her assigned program and serves as the PM's representative and primary point of contact (POC) at DA. The DASC reports to the ASA(ALT), Deputy for Systems Management and Horizontal Technology Integration (HTI). The DASC is responsible for keeping the acquisition chain of command informed of the status of the assigned acquisition program. In addition, the DASC assists the PM in issue resolution at DA and Office Secretary of Defense (OSD) levels. The DASC is the "eyes and ears" of the PM at DA level, and ensures the PM is apprised of any actions or circumstances impacting their program.

11–13. The program executive officer (PEO)

a. The PEO system and structure was implemented by the Army in 1987 in response to requirements established by the *Goldwater-Nichols Reorganization Act of 1986*, and the recommendation of the Packard Commission which the President approved and then implemented with National Security Defense Directive (NSDD) 219 (figure 11–4 depicts the PEO structure from OSD to PMO).

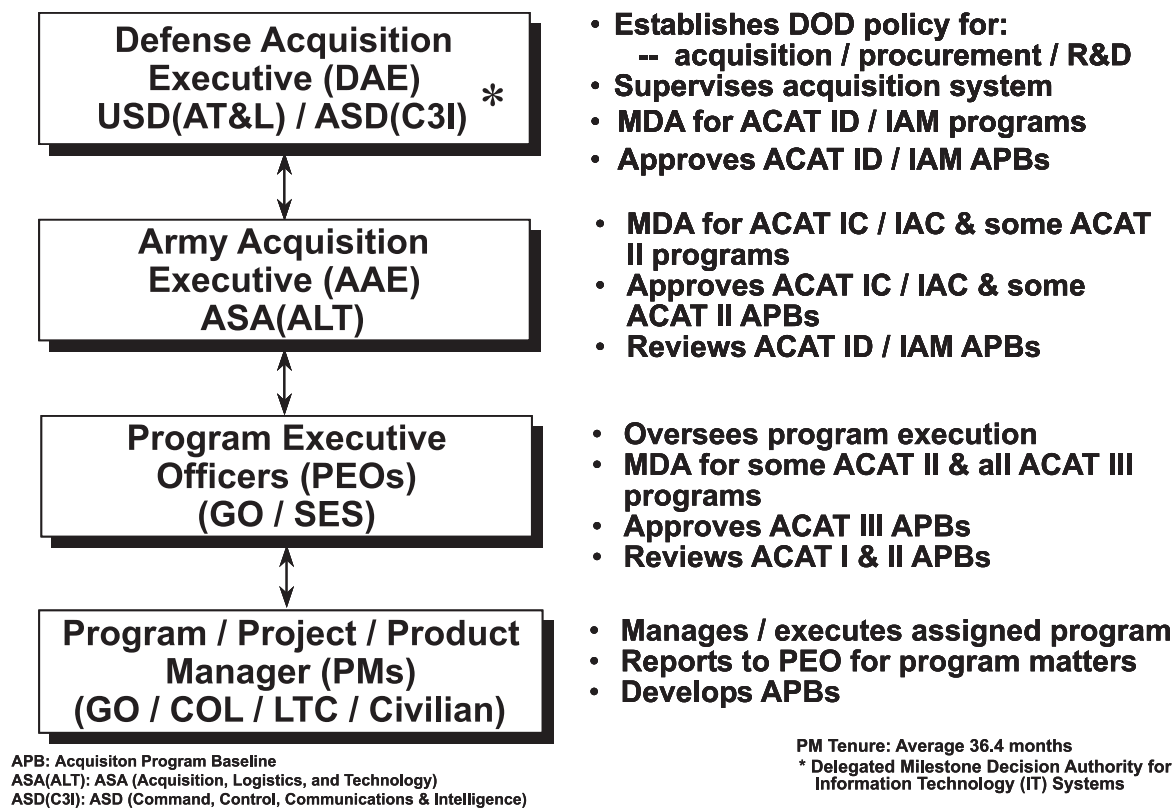


Figure 11-4. DoD Acquisition authority chart

b. The PEO, administers a defined number of AAE assigned MDAPs, major and/or non-major programs, and is responsible for establishing programmatics (materiel acquisition cost, schedule, and total system performance) and for the planning, programming, budgeting, and execution necessary to guide assigned programs through each milestone. The PEO also provides program information to the AAE, HQDA, DOD, and Congress; defends assigned programs to Congress through the Army legislative and budget liaison offices; participates in developing programmatic data to support AAE decisions in the PPBES process. Additional PEO and direct-reporting PM responsibilities include assisting the CBTDEV and training developer (TNGDEV) to develop capability development documents (CDD) by providing technical, availability, performance, anticipated materiel acquisition cost, and schedule information as needed.

c. The Army currently has twelve PEOs-Air and Missile Defense; Aviation; Chemical and Biological Defense; Command, Control, Communications Tactical; Intelligence, Electronic Warfare (EW) and Sensors; Ground Combat Systems; Combat Support/Combat Service Support Systems; Enterprise Information Systems; Simulation, Training, and Instrumentation; Tactical Missiles; Ammunition; Soldier.

d. The CBTDEV, referred to above, is the U.S. Army Training and Doctrine Command (TRADOC). TRADOC formulates and documents operational concepts, doctrine, organizations, and/or materiel requirements for assigned mission areas and functions. The CBTDEV serves as the user representative during the acquisition process, delineating the approved materiel requirements as well as doctrine and organization developments.

e. A MATDEV is the RDA command, agency, or office assigned responsibility for the system being acquired or under development. The term may be used generically to refer to the RDA community in the materiel acquisition process (counterpart to the generic use of CBTDEV).

f. A TNGDEV is a command or agency that formulates, develops, and documents or produces training concepts, strategies, requirements (materiel and other), and programs for assigned mission areas and functions. TNGDEV serves as user (trainer and trainee) representative during acquisitions of their approved training materiel requirements and training program developments. They perform the following functions solely in support of training systems:

(1) Program and budget resources for training aids, devices, simulations and simulators (TADSS) as specified in the training support requirements (TSR) annex of the CDD.

- (2) Embed system-training capabilities into assigned materiel systems in accordance with the approved system capability development document (CDD) and in coordination with the CBTDEV.
- (3) Develop, acquire, and field the subsystem training package with the materiel system.
- (4) Plan and program resources to execute NET. Where possible NER will use Distance Learning (DL) technology and/or contract NET as the desired training strategy in support of TRADOC developed/approved system training plan (STRAP).
- (5) Fund and conduct concept formulations for TADSS in support of assigned systems.
- (6) Program and budget resources to support and ensure attention to and integration of MANPRINT in the RDA processes.
- (7) Provide TNGDEV perspective through input to the Army RDA Plan and the AMP.
- (8) In coordination with the CBTDEV (TNGDEV for TADSS), conduct a crosswalk of the CDD to the request for proposal to verify that the RFP, including the system specification or purchase description and the statement of work (SOW), accurately reflects the operational requirements listed in the CDD for all programs. The MATDEV and CBTDEV (MATDEV and TNGDEV for TADSS) will formally certify that the RFP has been crosswalked with the CDD and that the documents are in agreement prior to the Army Systems Acquisition Review Council (ASARC) or program review.

11–14. The Program/Project/Product Manager (PM)

a. The program management approach to materiel acquisition management is a distinct departure from the Services' traditional practice of establishing functionally oriented organizations to carry out well defined, repetitive, and continuous long-term tasks. Program management is a tailored, task-oriented process. This approach requires the program manager (PM) to establish management arrangements among the PM office (PMO), other military organizations, and various contractors to coordinate their efforts and to accomplish program objectives effectively, efficiently, and economically. A variety of PMO organizations have been established. They operate on the matrix management principle and must draw all functional support from a host command or installation. In concert with recent restructuring, a project manager's office will be no more than the PM, Deputy PM, business manager, and all subordinate Command Select List (CSL) product managers. All additional positions require full justification based on the common and unique requirements for that PMO. The AAE is the approval authority for exceptions. In addition to the formal PM organization, the PM directs the informal MATDEV/CBTDEV team to execute the assigned materiel acquisition program. MATDEV/CBTDEV team is the terminology used to describe the informal, but essential close working relationship among the MATDEV, CBTDEV, and other players in the RDA management process (figure 11–1).

b. The PM has authority and responsibility for all programmatic cost, schedule, and performance decisions to execute the assigned program within the approved APB and subject to functional standards established by regulation, Secretarial direction, or law. Generically, all PMs are program managers, but they are chartered as a PM, a project manager, or product manager based on the value and importance of the program they manage. The criteria established for designation of a PM are generally the same as those which cause a system acquisition to be designated as a MDAP or major program-high defense priority, high dollar value, or high Congressional or OSD interest. Effective October 26, 2001, all Army acquisition programs, regardless of ACAT, are managed by a program/project/product manager (PM) either (1) overseen by a PEO or (2) directly reporting to the AAE. All PEOs report directly to the DAE (ACAT ID programs) or to the AAE (for ACAT IC and below). Project managers report to a PEO or the AAE. All product managers report to a project manager. As a general rule, a PM is a general officer or Senior Executive Service (SES); a project manager is a colonel or GS 15; a product manager is a lieutenant colonel or GS 14. This distinction between PMs is unique to the Army and does not apply to the other Services or within industry.

11–15. PEO Resource Control

The Army has revised its resource support system structure for the PEOs to improve their control over the funding and manpower resources they need to carry out their responsibilities. PEOs and subordinate PMs receive funding and personnel authorization resources directly from HQDA rather than through the materiel commands. The materiel commands continue to provide a variety of support services without duplicating any of the PEOs or PMs management functions. This enhanced resource control system ensures PEO and PM-managed programs operate as centers of excellence, managed with modern efficient techniques, without administrative burdens or materiel command layers being inserted into the chain of command.

11–16. Acquisition Career Management

a. The MILDEP to the ASA(ALT) serves as the Army DACM. The DACM is assisted by the Deputy Director, Acquisition Career Management (DDACM) and the Acquisition Support Center in OASA(ALT). The Deputy Assistant Secretary of the Army (Civilian Personnel Policy) and the Deputy Chief of Staff, G–1 work closely with the DACM to implement DAWIA requirements and intent of the Army.

b. The AAC was established for both military and civilian personnel and is a subset of the entire Army acquisition and technology work force (A&TWF). The A&TWF consists of those personnel who work directly with acquisition in the various ACFs at the CPT/GS–5/Broad Band Equivalents and above levels. The AAC consists of military and

civilian personnel at the rank/grade of MAJ/GS-13/ Broad Band Equivalents and above who have met the statutory requirements for experience, education and training. Current Army policy focuses on accessing individuals at the GS-14 and above level into the AAC. All A&TWF positions at rank/grade of LTC/GS-14/ Broad Band Equivalents and above are designated CAPs and must be occupied by AAC members. Program management and contracting positions are regulated by statute or regulation dictating education, training, and experience requirements that must be met prior to placing an individual in these positions.

(1) AAC vision. The strategic vision for the AAC forms the foundation for all policies and initiatives impacting the A&TWF. This vision is to develop " *a corps of leaders willing to serve where needed and committed to providing soldiers the systems critical to decisive victory now and in the future through development, integration, acquisition, fielding, and sustainment...one integrated corps ...It is these leaders the Army must develop early in their careers to ensure they possess the requisite experience and skills to successfully manage the acquisition challenges of the 21st century.*" The key to developing the best possible leaders for the Army lies in educating the workforce, particularly at the lower levels, as to the DAWIA requirements and the policies, procedures, and tools available to meet those requirements.

(2) Career development as a mission. The leader development career pattern for an AAC officer is clearly defined and highly rewarding. Military acquisition career development is covered under *DA Pamphlet 600-3, Commissioned Officer Professional Development and Utilization*. An officer should normally serve eight years in branch qualifying assignments prior to entering the AAC. Upon AAC selection, the officer will attend functional area (FA) specific military training courses, and selected officers will have the opportunity to attend advanced civil schooling (ACS). Attendance at ACS is contingent on the officer's manner of performance, potential for academic success, and support of his/her career time line. Graduate level education opportunities are an important part of career development within the AAC. However, job experience and strong performance across a variety of acquisition positions remains the key indicator for success. Recent initiatives seek to increase developmental acquisition experience opportunities while providing improved support for alternative advanced degree schooling. AAC officers compete for product/project management or acquisition command positions in the same manner as field commands. AAC LTCs and COLs are ineligible for selection to non-acquisition command positions. For career development of civilians, IAW Army Policy AAC-96-01, the Army has developed a civilian acquisition career model as well as a matrix of quality achievement factors as a "roadmap for success." The focus of the career model is to begin to develop acquisition leaders and managers early in their careers, giving them a broad-based knowledge of the various acquisition functions supported by leadership and management experience. The quality achievement factors are the combination of training, education, and experience at the higher grade.

11-17. Headquarters, Department of the Army (HQDA)

a. Chief of Staff of the Army (CSA). The CSA is responsible by law to the SA for the efficiency of the Army and its preparedness for military operations. The CSA acts as the agent of the SA in carrying out the plans or recommendations submitted by the ARSTAF and approved by the SECARMY. The VCSA supports the CSA by managing the day-to-day operations of the Army. The VCSA chairs the Army Requirements Oversight Council (AROC) and in the area of RDA, the VCSA co-chairs the ASARC.

b. Deputy Under Secretary of the Army (Operations Research). The DUSA (OR), designated Army Test and Evaluation (T&E) Executive, establishes, reviews, supervises and enforces Army T&E policy and procedures; oversees all Army T&E associated with RDA, as well as combat development programs; provides staff management (policy formulation, program direction, and resource oversight) of all T&E programs of interest to OSA; approves all test and evaluation master plans (TEMP) (see para 11-64i) requiring HQDA approval; and is responsible for all software development for M&Ss and software T&E policy.

c. Assistant Secretary of the Army (Financial Management and Comptroller) (ASA(FM&C)). The ASA(FM&C) has secretariat responsibility for all financial management activities and operations for APFs. While the budget is in preparation, the ASA(FM&C) receives and consolidates procurement and RDTE budget forms from MACOMs and PEOs. The ASA(FM&C) also:

- (1) Works with the AAE on all cost and economic analysis (EA) matters related to the acquisition process.
 - (2) Carries out all financial management responsibilities assigned under Title 10.
 - (3) Tasks the appropriate CBTDEV or MATDEV to conduct program office estimates (POE) and/or economic analyses (EA) to milestone decision review (MDR) and PPBES requirements.
 - (4) Manages all budgeting activities in support of the Army materiel requirements processes and RDA modernization program, with the framework of PPBS/PPBES.
 - (5) Develops statutory independent cost estimates (ICEs) and component cost analyses (CCAs) for weapon and information systems. Chairs and oversees the Army Cost Review Board (CRB) and approves the ACP for all major acquisition programs. The ASA(FM&C) Deputy for Cost Analysis ensures that the ACP reflects the costs and risks associated with the program in concurrence with the cost as independent variable (CAIV) process.
- d. Assistant Chief of Staff for Installation Management (ACSIM). The ACSIM is responsible for developing criteria to mitigate environmental impacts, and reviewing emerging Army RDA systems for environmental effects.

e. Army CIO/ Deputy Chief of Staff, G-6. The CIO/G-6 has ARSTAF responsibility for Army AIS and IT activities. These include establishing and approving policies, procedures, and standards for the planning, programming, life-cycle management, use of Army IT resources, and responding to and validating all warfighting requirements. As directed in the *Information Technology Management Reform Act (ITMRA) of 1996*, the G-6 also serves as the Army CIO. The primary CIO responsibility under *ITMRA*, is the management of resources for all Army information programs. The DCS, G-6 is a regular member of the Army Systems Acquisition Review Council (ASARC), the Army Requirements Review Council (AROC), and the Requirements Review Council (RRC). Additional CIO/G6 responsibilities are:

- (1) Serving as the Army CIO.
- (2) Serving as the Army G-6 for information and signal operations, network and communications security, force structure, equipping and employment of signal forces.
- (3) Developing policy and guidance on information management and C4/IT (including automation, telecommunications, visual information, and related activities, services, and programs).
- (4) Developing, coordinating, and implementing Army Knowledge Management, the Army Enterprise Architecture, the total Army Enterprise Infostructure and the Army Enterprise portal.
- (5) Advising and assisting the ASA(ALT) on all matters relating to acquisition of C4/IT.
- (6) Providing CIO Assessment of National Security Systems and IT Systems as defined in the Clinger-Cohen Act (CCA) and CIO certification of CCA compliance for all major AISs.
- (7) Providing oversight of joint military satellite communications programs and projects.

f. Deputy Chief of Staff, G-1 (DCS, G-1). The DCS, G-1 has ARSTAF responsibility for personnel management. ODCS, G-1 monitors planning for the manpower and personnel aspects of new systems. Also, the ODCS, G-1 is the proponent and has primary ARSTAF responsibility for the DOD human systems integration (HSI) program (called MANPRINT program in the Army). The emphasis of the MANPRINT program is to enhance total system performance (soldier in the loop) and to conserve the Army's manpower, personnel and training (MPT) resources. The DCS, G-1 is a regular member of the AROC and RRC. The HQDA personnel system staff officer (PERSSO) is the personnel community ARSTAF representative. The PERSSO provides for the continuous coordination necessary to ensure the smooth integration of new equipment, materiel systems, and new organizations. The PERSSO responsibilities include, but are not limited to: preparing and justifying force structure requests in conjunction with the ODCS, G-3 OI and ODCS, G-8 synchronization staff officer (SSO); reviewing and coordinating the development of force structure changes; developing personnel supportability architecture, officer and enlisted issues related to new organizational concepts and doctrine; and ensuring programming and budgeting of manpower spaces. The PERSSO participates in all HQDA actions to develop the staff position on CBTDEV proposals for potential MDAPs (mission need/solution analysis), the designation of a proposed system, the recommendations on the elements of system fielding including the proposed BOIP, the IIQ, and the AAO. The PERSSO represents the DCS, G-1 at force modernization-related, HQDA-sponsored conferences, forums, and meetings on issues of supportability concerning the introduction of new and/or reorganized existing TOE/TDA units.

g. Deputy Chief of Staff, G-2 (DCS, G-2). The DCS, G-2 provides scientific and technical intelligence and threat projections in support of all aspects of the Army RDA programs. In addition, a HQDA threat integration staff officer (TISO) is designated by the DCS, G-2 to function as the HQDA threat integration coordinator for designated mission areas, programs, and systems. The TISO represents the DCS, G-2 on all aspects of threat support throughout the system life-cycle or study process. The TISO system complements the DCS, G-3 requirements staff officer (RSO) and DCS, G-8 synchronization staff officer (SSO) and is designed to foster closer coordination among the intelligence community, MACOMs, and ARSTAF agencies to ensure the timely integration of the threat into the materiel acquisition process. The TISO system supplements existing management procedures but does not relieve ARSTAF agencies and MACOMs of established responsibilities. The DCS, G-2 is the approving authority for either establishing or ending TISO monitorship of systems. Generally, all programs designated as Army MDAP, major or non-major systems will be assigned to a TISO for monitorship on an as required basis with approval of the ODCS, G-2. The DCS, G-2 is a regular member of the AROC, and RRC.

h. Deputy Chief of Staff, G-3 (DCS, G-3). As the Army's Force Manager, the DCS, G-3 serves as the HQDA proponent for all Army force structure related policies, processes, and actions. The DCS, G-3 is a regular member of the ASARC, AROC, and RRC. The ODCS, G-3:

- (1) Integrates Army DOTMLPF requirements into structure.
- (2) Approves operating and generating force requirements and allocates resources to accomplish DCS, G-3 prioritized Army missions and functions.
- (3) Develops and maintains force planning guidance and active and reserve component force structure through the TAA force accounting, force documentation and other force management forums.
- (4) Oversees the force management, Transformation Campaign Plan (TCP), prioritization, and requirements approval processes for the Army. The DCS, G-3 is a regular member of the ASARC and RRC. The DCS, G-3 is assisted by the ADCS, G-3, who has supervisory responsibility for:

- Directorate of Force Management (DAMO-FM) - force management process.

How the Army Runs

- Army Transformation Office (DAMO-ZT) - Transformation Campaign Plan (TCP).
- Office of Resource Analysis and Integration (DAMO-ZR) - prioritization process.
- Directorate of Requirements (DAMO-RQ) - requirements validation and approval process.

(5) ODCS, G-3 Requirements Directorate (DAMO-RQ). Within the ODCS, G-3, DAMO-RQ is the single entry point for all Army and Joint DOTMLPF requirements. DAMO-RQ is the proponent for policy development and requirements generation system (RGS) process oversight. Within DAMO-RQ, the requirements staff officer (RSO) is directly responsible for leading HQDA staff integration and coordination efforts for all Army and Joint DOTMLPF requirements issues within the RGS. The RSO coordinates with his/her G-8 counterpart, the synchronization staff officer (SSO), to facilitate the transition from requirements development and approval to requirements solutions (execution and resourcing). DAMO-RQ is composed of four branches: Policy and Procedures Branch and three RSO Branches (land dominance; command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR); sustainment). Functions and responsibilities are:

(a) Interacts with the JS and other services for all Joint, other service, and Army DOTMLPF requirements issues.

(b) Provides ARSTAF lead for coordinating applicable Army requirements through Office of Joint and Defense Affairs (OJDA), with the JS for JROC review.

(c) Maintains catalog of approved requirements documents (CARDS) files.

(d) Provides the Army position on other Service / Combatant Commanders DOTMLPF requirements.

(e) Staffs and coordinates Joint Warfighting Capabilities Assessment (JWCA) conceptual and doctrinal studies for the Army.

(f) Develops policy and procedures, and coordinates operational (urgent) need statements (ONS), directed requirements, and other immediate operational requirements for approval.

(g) Participates in all combat development and acquisition associated initiatives that have a potential impact on the Army's RGS process.

(h) Develops policy and procedures, in coordination with ASA (ALT) and ODCS, G-8 on the rapid acquisition prototyping for transformation (RAPT).

(i) Provides the Army's position for all science board (ASB or DSB), General Accounting Office (GAO), Army Audit Agency (AAA), Inspector General (IG) or similar agency audits or special reviews that impact the RGS process.

(j) Develops policy and procedures for development and management of manpower estimate reports (MER) (see para 11-64j).

(k) Utilizes RSOs to lead requirements analysis teams to analyze, coordinate, and provide recommendations on all DOTMLPF requirements.

(6) Requirements staff officers (RSOs). G-3 (DAMO-RQ) RSOs facilitate the staffing, validation, approval, and prioritization of all Army DOTML PF requirements. Primary functions and responsibilities are:

(a) Establish a single ARSTAF focal point for Army requirements.

(b) Enable ODCS, G-3 to validate and prioritize requirements.

(c) Ensure DOTMLPF integration for all requirements.

(d) Link requirements and resources to Army's Transformation Campaign Plan (TCP).

(e) Maintain link between ODCS, G-3 and field.

i. Deputy Chief of Staff, G-4 (DCS, G-4)). The DCS, G-4 assesses the logistical supportability of materiel systems during the system acquisition process. The DCS, G-4 participates in all phases of the RDA management process to ensure equipment is logistically reliable, supportable, and maintainable. ODCS, G-4 is also responsible for secondary item requirements including secondary item war reserve requirements. The DCS, G-4 is a regular member of the ASARC, AROC, and RRC.

(1) The DCS, G-4 is the responsible official for sustainment (ROS) to the AAE and is a regular member of the ASARC. As the ROS, the DCS, G-4 is assisted by the Deputy ASA(ALT) for Integrated Logistical Support, who is the DA focal point for a system's ILS program

(2) The HQDA logistics support officer (DALSO) is the HQDA representative of the logistics community, providing logistics coordination. The DALSO monitors the progress of the assigned system and ensures that all elements of ILS, as outlined in AR 700-127, are satisfactorily completed. Because of the interrelationships of assigned responsibilities in materiel acquisition, close and continuous coordination and cooperation is essential between the DALSO and his counterparts at TRADOC, AMC, and the HQDA Staff. In addition to new items of equipment, DALSOs also have responsibility for existing weapons and materiel systems in the Army force structure. This responsibility covers all phases of logistics support to include readiness, redistribution, and disposal.

(3) The DALSO's primary mission is to provide HQDA general staff supervision over the ILS management of assigned commodity materiel/weapons systems from concept to disposal. Other responsibilities include:

(a) ARSTAF responsibility for logistical acceptability, deployability, and supportability of materiel systems, interoperability, ILS, materiel release, and logistics R&D programs for the Army.

(b) Serving as the logistician in the materiel acquisition process for other than medical equipment, and conduct

surveillance over logistics aspects of materiel acquisition and modification programs to ensure delivered systems are supportable.

(c) Providing policy guidance for logistics for medical and engineer materiel acquisition.

j. Deputy Chief of Staff, G-8 (DCS, G-8). The ODCS, G-8 prepares the Army POM. In this capacity the ODCS, G-8 integrates and synchronizes the POM process and provides analysis and evaluation of Army programs to senior Army leadership. The DCS, G-8 is a regular member of the ASARC, AROC, and RRC. The ODCS, G-8 responsibilities include:

(1) Army Program Advocate to OSD, the JS, other military departments, government agencies and organizations.
 (2) Oversees materiel fielding across the Army and ensures integration of DOTMLPF into materiel solutions in accordance with (IAW) approved Army requirements.

(3) Serves as principal advisor to the CSA on joint materiel requirements representing the Army in the JROC, Joint Requirements Board (JRB), and Joint Warfighting Capabilities Assessment (JWCA) process.

(4) Serves as the lead for all QDR activities and in coordination with the DUSA(OR) oversees the Army Studies Program.

(5) G-8 Director of Program Analysis and Evaluation (DPAE). Within ODCS, G-8, the DPAE is responsible to review and analyze requirements and programs in force structure development, providing analytical support to the ARB and subordinate committees, developing resource guidance, developing and compiling the POM, maintaining the Army portion of the DOD FYDP, and presenting an affordability analysis to the ASARC. Other responsibilities include conducting and presenting affordability assessments to support DOD and HQDA ACAT I programs and managing the programming phase of the PPBES.

(6) G-8 Force Development Directorate (Dir, FD). Within ODCS G-8, the Director, FD translates approved Army DOTMLPF requirements into programs, within allocated resources, to accomplish Army missions and functions. In addition Dir, FD exercises life-cycle management of materiel programs. The Dir, FD is organized into a Directorate of Materiel (DOM), Directorate of Integration (DOI) and a Directorate of Resources (DOR).

(a) The Director of Materiel (DOM) is charged with the responsibility to manage all the materiel programs. Synchronization staff officers (SSO) and SIs shape these programs to ensure DOTMLPF integration - verifying installation, training, and sustainment enablers are properly resourced. Programs are fielded using the total package fielding (TPF) (see para 11-56 and 11-57) concept, which supports USF to designated units within the ATCP.

(b) The Director of Integration (DOI) responsibilities includes ensuring programs and process integration for force development. Integration includes the coordination of: the S&T investment strategy; annual ACTD plan, and procurement to support the Army TCP. DOI ensures USF plans and schedules properly reflect priorities set by the ODCS, G-3; that systems are packaged by capability and function in unit sets; that fielding plans and schedules track with the Army TCP, and are executable by system SSOs.

(c) Synchronization staff officers (SSO)/SIs. Within G-8 DIR, FD, the SSOs and SIs focus on systems and fielding to deliver capabilities and functions to the warfighting force structure of the Army. SSOs are the single ARSTAF POCs for integration & synchronization of all Army materiel programs to achieve Army Vision, TCP priorities, and modernization strategy. Generally, the SSO is responsible for the integration, synchronization, and coordination of hardware, software and associated equipment in support of the Army TCP. All equipment is fielded using the USF methodology managed by G-8 Dir, FD (DAPR-FDH). In most G-8 Divisions, SSOs oversee SIs for assigned systems. The following lists most of the responsibilities of the SSO/SSI:

- Understand the interrelationships of all battlefield functional areas;
- Understand the tenets of Joint Vision;
- Understand Joint interface of programs and systems;
- Understand the Army transformation process and the Army's TCP;
- Understand the USF process and the Army's modernization plan (AMP);
- Understand the recapitalization process;
- Integrate parallel, complementary developments in: DOTMLPF, so that fully deployable systems arrive in the field;
- SSOs review distribution plans, prepared by SIs, for new systems and redistribution plans for replaced systems;
- Prepare correspondence for approval and transmittal to Congress, OSD, HQDA staff elements, and subordinate headquarters;
- Ensure programming of funds for assigned programs (all appropriations);
- Recommend studies or other actions necessary to support a program or requirement;
- Ensure programming and budgeting for required manpower spaces;
- Assist in developing manpower tradeoffs in the force structure with the organizational integrators (OIs) ODCS, G-3 (DAMO-FM);
- Conduct Army system reviews (ASRs);
- Conduct annual reviews and recommend priorities for science and technology objectives, for the conduct of RDTE, for procurement and PIPs;
- Develop and coordinate HQDA recommendations on designation of a proposed acquisition program as defense, major or non-major program;

How the Army Runs

- Identify required operational and force development tests in coordination with the CBTDEV and Army Test & Evaluation Command (ATEC);
- Coordinate scheduling and preparation of ASARC/DAB/ITAB reviews with the appropriate ASA(ALT) system coordinator (DASC);
- Represent the DCS, G-8 on study advisory groups for analysis of alternatives;
- In coordination with the ARSTAFF, identify priorities, unit by unit, to establish the initial operational capability (IOC), leading to the distribution of new or improved systems;
- Provide justification for the continuing requirement for a system at OSD and OMB reviews and in congressional briefings and testimony;
- Conduct system and organizational assessments as required;
- Ensure rationalization, standardization, and interoperability with allies whenever possible; and
- Ensure systems are accurately portrayed in Army requirements studies.

k. The Surgeon General (TSG). TSG has ARSTAF responsibility for medical RDTE, and is the Army medical MATDEV. The TSG is also responsible for the medical aspects of all other development and acquisition programs ensuring mission area interface with CBTDEVs. The TSG serves as a member of the ASARC for medical issues, including health hazard assessment (HHA), personnel safety, and hazards remediation. Other responsibilities include:

(1) Developing policy, responsibilities, and procedures to ensure implementation of systems acquisition policy as it applies to combat medical systems, medical readiness and health care programs, and other assigned Army and joint service requirements.

(2) Assigning support responsibilities for medical materiel development and acquisition to agencies and activities under TSG command and control.

(3) Recommending materiel requirements and associated priorities for medical readiness and health care programs to TRADOC.

(4) Establishing mission area interface with TRADOC for all medical programs, ensuring requirements and interests of each participating service are provided full consideration in medical programs for which the Army has lead agency or executive agency responsibility.

l. Chief of Engineers (COE). The COE monitors requirements and R&D necessary to provide construction design criteria, construction techniques, and construction material for the Army, Air Force, and other government agencies. The COE provides fixed-facility concealment, camouflage, and deception; real estate management techniques; and engineering support for maintenance of installation and facilities. It is the COE's mission to preserve and improve environmental quality associated with construction and facilities and Army environmental quality and R&D activities covering atmospheric, terrestrial, and topographical sciences. The COE is also responsible, under the general direction of the AAE, for the RDTE of fixed and floating power systems, and high voltage generation applications (to include nuclear applications). The COE reviews all emerging Army systems for digital terrain data requirements and environmental effects such as climate, terrain, or weather. The review also includes minimization of toxic and hazardous wastes and those hazardous wastes associated with normal system test, operation, use, and maintenance.

m. The General Counsel (GC). The GC advises the AAE and the ASARC on any legal issue which arises during the acquisition of a weapon or materiel system. The GC reviews all Army acquisition policy and supervises all attorneys providing legal advice related to programs within the Army RDA management system. The GC is also responsible for all legal advice in the negotiation, oversight, and review of international cooperative RDA programs.

11–18. Major Army Commands (MACOMs)

a. U.S. Army Military Traffic Management Command (MTMC). MTMC provides transportability engineering advice and analyses to the MATDEV, CBTDEV and TNGDEV; provides item, unit, and system transportability assessments for MDR; provides transportability approval or identify corrective actions required to obtain approval for all transportability problem items; and reviews all military requirements document (MRD) (see 11–24 and 11–61) to assess adequacy of transportability.

b. U.S. Army Medical Command (MEDCOM). MEDCOM is the medical CBTDEV, TNGDEV, trainer, and user representative. MEDCOM conducts medical combat and training development activities as assigned by CG, TRADOC and TSG; reviews and evaluates materiel and TADSS requirements documents to identify and assure that adequate consideration is given to the prevention of health hazards from operating or maintaining materiel systems, and conduct the HHA program, as required; conducts and supports assigned OTs; and forwards all medical warfighting concepts and requirements documents to TRADOC for review and appropriate action.

c. U.S. Army Intelligence and Security Command (INSCOM). INSCOM is the CBTDEV for strategic signals intelligence (SIGINT) systems and INSCOM sole-user intelligence, EW systems used to formulate doctrine, concepts, organization, materiel requirements, and objectives. INSCOM responsibilities include:

(1) Preparing requirements documents and serving as the Army CBTDEV during development and fielding of new SIGINT and information security (INFOSEC) systems under the purview of the NSA and having sole application to

U.S. SIGINT and INFOSEC systems. INSCOM forwards warfighting concepts and requirements documents to TRADOC for review and appropriate action.

(2) Coordinating with the PEO or MATDEV on matters pertaining to INSCOM sole-user SIGINT and intelligence, security and electronic warfare (ISEW) systems acquisitions.

(3) Coordinating with the CG, TRADOC, on requirements generation for other INSCOM sole user intelligence, security, and electronic warfare (ISEW) systems and conduct combat and training developments for these Army systems when directed by HQDA, and/or Director, Central Intelligence (DCI), or at the request of CG, TRADOC.

(4) Ensuring documentation of requirements for training support products, system TADSS, and/or embedded training for INSCOM systems.

(5) Providing threat documentation to TRADOC as validated and approved by HQDA DCS, G-2.

(6) Recommending materiel requirements and associated priorities for strategic intelligence and security readiness to CG, TRADOC.

d. U.S. Army Materiel Command (AMC). AMC performs assigned materiel and related functions for logistics support of materiel systems, and other materiel acquisition management functions required by HQDA. The CG, AMC is a regular member of the RRC. The AMC mission, in support of RDA, is to:

(1) Equip and sustain a trained, ready Army.

(2) Provide development and acquisition support to MATDEVs (PEOs and PMs).

(3) Provide equipment and services to other nations through the Security Assistance Program.

(4) Define, develop, and acquire superior technologies.

(5) Maintain mobilization capabilities necessary to support the Army in emergencies.

(6) Verify system safety; support developmental OTs; and participate in the continuous evaluation (CE) process.

(7) Exercise delegated authority, under ASA(ALT) oversight, in the following areas: metrication; design to cost; production readiness reviews; manufacturing technology, standardization; RAM; quality; risk management; value engineering; parts control; and industrial modernization improvement.

(8) Provide survivability, vulnerability, or lethality assessments and survivability enhancement expertise for all Army materiel programs.

(9) Evaluate and recommend improvements to the industrial base.

(10) Responsible for the logistics support of assigned materiel in response to approved materiel requirements.

(11) Plan, coordinate, and provide functional support to PEOs and PMs. Support includes, but is not limited to, procurement and contracting, legal, managerial accounting, cost estimating, systems engineering, conducting system TADSS and embedded training concept formulation, DT, logistics support analyses, MANPRINT, environmental, intelligence and threat support, configuration management, and conducting various independent assessments and analyses.

(12) Provide overall management of the Army's technology base (less Class VIII), including identifying for acquisition, mature technologies necessary to support warfighting materiel systems.

(13) Provide RDA science and infrastructure information to HQDA for the Army RDA Plan.

(14) Provide initial and updated cost and system performance estimates for battlefield and peacetime operations as inputs to supporting analysis and program decisions.

e. U.S. Army Training and Doctrine Command (TRADOC). TRADOC is the Army's primary "user representative" in the materiel acquisition process. TRADOC performs assigned materiel and related functions for operations research and analysis, evaluation of products of the requirements generation system, operational and organizational (O&O) planning, logistics support planning, quantitative and performance requirement specifications for materiel systems, and other combat development functions required by DA. As the Army's principal CBTDEV, TRADOC guides, coordinates, and integrates the Army's total combat development effort. Combat developments are a major component of force development and encompass the formulation of concepts, doctrine, organization, materiel objectives, requirements, and OTs of products of the requirements generation system (RGS).

(1) The CG, TRADOC is a regular member of the ASARC and RRC. As the Army's primary CBTDEV/TNGDEV, TRADOC is the Army's *architect for the future* and is charged to chart the course for the Army. In doing this, CG, TRADOC:

(a) Guides and disciplines the RGS by:

- providing requirements generation and documentation procedures and process guidance;
- establishing and implementing horizontal requirements integration (HRI) policy;
- generating all Army warfighting requirements prior to their submission to HQDA for approval;
- approving integrated concept team (ICT) minutes or reports containing proposing solution sets for force level and proponent/branch level force operating capabilities (FOCs); and,
- coordinating MRDs produced by the Army community and forward to HQDA ODCS, G-3 (DAMO-RQ) for validation, approval, and prioritization.

(b) Assists HQDA to prioritize and justify warfighting requirements by:

How the Army Runs

- determining applicability of ONS to future Army-wide requirements and assign to a proponent for requirement documentation;
- providing insights and descriptive information for materiel programs; and
- supporting ODCS,G-3 by presenting documents and information to the JROC and Joint Warfighting Capabilities Assessment (JWCA) process and assisting in issue resolution.

(c) Coordinates and integrates the Army's total combat/training developments efforts by:

- providing, with appropriate support from other MACOMs, the capstone warfighting concept and FOCs, the start point for the RGS;
- developing and maintaining the C4I operational architecture;
- being the primary source for determining need for and preparing requirements and requirements documents for TADSS and embedded training; and
- determining need for and obtain CSA approval for conduct of advanced warfighting experiments (AWE).

(d) Conducts AoA for ACAT I, IA, and most ACAT II programs when required by HQDA. When required by the MDA, conduct AoA for all other ACAT programs.

(e) Serves as member of the Army S&T Advisory Group (ASTAG).

(f) Provides representative to Army S&T reviews and management teams.

(2) TRADOC is organized into integrating centers and mission area schools and centers. The principal integrating centers in the materiel acquisition process are the Combined Arms Center (CAC), Fort Leavenworth, KS and the Combined Arms Support Command (CASCOM), Fort Lee, VA. The mission area schools and centers are the branch schools and centers for Infantry, Armor, Field Artillery, Air Defense Artillery, Aviation, etc. The Directorates of Combat Developments (DCDs) at the TRADOC mission area school and centers work very closely with the PEO community in the RDA management process.

(3) The TRADOC counterpart to the PM, the TRADOC system manager (TSM), is a central figure in the RDA process and a key member of the MATDEV/CBTDEV team. The TSM is chartered by the CG, TRADOC to function as focal point for coordination of the CBTDEV/TNGDEV efforts in the development and acquisition of a materiel or automated information system. The TSM is responsible to synchronize all doctrine, organization, training, leader development, personnel, and facilities (DOTLPF) domains that are impacted by the fielding of a MDAP, major or non-major materiel system. TSMs are appointed for selected acquisition programs. In some cases, a TRADOC program integration office (TPIO) may be appointed for a systems-of-systems such as Army Battle Command System (ABCS), Combat ID, etc. A TSM/TPIO is appointed early in the development cycle, normally at the same time as the PM. The TSM is usually located at the proponent school and center. For systems without an assigned TSM/TPIO, the DCD at the proponent school and center serves as the focal point.

f. U.S. Army Special Operations Command (USASOC). In support of materiel systems RDA management, USASOC establishes mission area interface with TRADOC for all programs, ensuring that requirements and interests of each participating agency are provided full consideration in programs for which the Army has lead agency or executive responsibility, and serves as the special operations trainer and user representative. In addition, USASOC:

(1) Forwards all non-SOC unique warfighting capability requirements and documents to CG, TRADOC for appropriate action.

(2) Forwards SOC unique requirements documents to CG, TRADOC for review and appropriate action.

(3) Monitors TRADOC projects and identifies needs affecting the USASOC mission and responsibility.

(4) Supports TRADOC field activities conducting and supporting testing, and monitoring RDA projects to include potential force standardization and interoperability.

(5) Participates in warfighting experiments, as appropriate.

g. U.S. Army Space and Missile Defense Command (USASMDC). USASMDC is the principal assistant and advisor to the SA and the CSA for all matters pertaining to space and strategic defense. The USASMDC is responsible for technology development programs related to strategic and tactical missile defense, space defense, and satellite technology. The command conducts missile defense technology base R&D activities in support of the Missile Defense Agency (MDA), assures transfer of technology between the Ballistic Missile Defense Organization (BMDO) and Army systems, and provides matrix support to PEO Air and Missile Defense. USASMDC is also chartered by CSA as the Army level operational advocate and focal point for theater missile defense (TMD). The CG, USASMDC, assists in the development of Army TMD positions, reflective of work being done in TRADOC, and represents those positions at HQDA, OSD, MDA, JS, Congressional, and other high-level forums.

11-19. Other DA agencies

a. U. S. Army Test and Evaluation Command (ATEC). ATEC is a FOA under the CSA. The CG, ATEC is responsible for management of the Army's operational testing, developmental testing, and system evaluation processes. Their evaluations of materiel and IT systems' operational effectiveness, suitability and survivability are independent of

the CBTDEV/MATDEV and the results are reported directly to the MDR body. CG, ATEC is a member of the ASARC, advisor to the Army Requirements Oversight Council (AROC), and chairman of the Test Schedule and Review Committee (TSARC). The TSARC is the HQDA centralized management forum for user (operational) testing resources. ATEC provides advice and assistance to the CSA, the VCSA, other members of the ARSTAF, and other elements of DA on Army test and evaluation matters. Other responsibilities:

- (1) Reviews all draft MRDs for T&E implications.
- (2) Assists TRADOC (CBTDEV/TNGDEV) in developing evaluable, operationally relevant, and totally system focused critical operational issues and criteria (COIC). Provide advice concerning methods and measures to evaluate the system against the COIC and advise on the resources and ability to test and evaluate the system.
- (3) Supports the TRADOC advance warfighting experiment (AWE) program and concept experimentation program (CEP).

b. U.S. Army Medical Research and Materiel Command (USAMRMC) (see para 19–11). USAMRMC is the medical MATDEV, logistician, and developmental tester and is responsible for RDA and logistic support of assigned materiel in response to approved materiel requirements. In addition, USAMRMC:

- (1) Plans, programs, budgets, and executes medical RDTE tasks that support system RDA to include required system training support products, TADSS, and/or embedded training.
- (2) Plans, coordinates, and provides functional support to USAMRMC organizations. Support includes, but is not limited to, procurement and contracting, legal, managerial accounting, cost estimating, systems engineering, conducting system TADSS and embedded training concept formulation, developmental testing, ILS, MANPRINT, environmental management, configuration management, and conducting various independent assessments and analyses.
- (3) Assists the medical CBTDEV/TNGDEV in the requirement generation system.
- (4) Reviews requirement documents to determine their adequacy and feasibility and for logistical support aspects of materiel systems to include ILS.
- (5) Develops and maintains the physiological, psychological, and medical data base to support the HHA, system safety assessments (SSA), and human factors engineering analysis (HFEA).
- (6) Evaluates and manages the materiel readiness functions in the medical materiel acquisition process.
- (7) Functions as TSG agency for the materiel acquisition of medical nondevelopmental items (NDI), commercial off-the-shelf (COTS) items, and sets, kits, and outfits.

c. U.S. Army Medical Department Center and School (AMEDDC&S). AMEDDC&S is the medical CBTDEV, TNGDEV, doctrine developer, and operational tester. In addition, AMEDDC&S develops doctrine, organizations, and systems requirements within the guidelines established by the CG, TRADOC and in accordance with TSG established Army health care standards.

Section IV

Materiel requirements generation system

11–20. Policy

a. *DODD 5000.1* and *DODI 5000.2* provide mandatory DOD acquisition policy and procedures including materiel requirements documentation and approval guidance for MDAPs for both materiel and AIS. *Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01B* mandates policy and procedural guidance for the requirements generation system to include guidance on key performance parameters (KPP), measures of effectiveness (MOEs), and the JROC. *AR 70–1* provides Army acquisition policy for materiel and information systems. *AR 71–9* provides Army requirements generation and documentation policies and responsibilities implementing *DODD 5000.1*, *DODI 5000.2*, and *CJCSI 3170.01B* supporting all Army ACAT I through III materiel and information systems. ACATs are shown in figures 11–3a and 11–3b. The terms materiel and materiel system in this chapter apply to materiel and IT systems unless specifically stated otherwise. On October 30, 2002 the DEPSECDEF directed the revision of *DOD Directive 5000.1* and *DOD Instruction 5000.2*. On October 7, 2002 the Vice Director of the Joint Staff directed a revision to *CJCSI 3170.01B*. As of this update, total impact on policy governing the management of the Defense Acquisition System and the requirements generation system is not known.

b. The main governing policies are summarized below:

- (1) The requirements generation system (RGS) provides a current and future Army capable of success in any contingency from humanitarian assistance to full tactical operations in joint and combined environments. The process will be responsive to the urgent materiel requirements of the deployed warfighter as well as project the full set of DOTMLPF requirements for the Army to be mission capable in near-, mid-, and far-term operations.
- (2) Field commanders document and submit their urgent warfighting operational requirements and obtain support via the ONS process discussed in *AR 71–9* and *TRADOC Pamphlet 71–9*.
- (3) Commanders with combat developments missions conduct continuing analyses to identify and define near-through far-term DOTMLPF requirements.
- (4) Force operating requirements for all DOTMLPF domains will be related to the CSA approved capstone operational warfighting concept and associated lower level supporting and integrating concepts. The current approved

capstone warfighting concept for the Army (*TRADOC Pamphlet 525–3–0*) is Army Transformation (Objective Force). Requirements not related to these warfighting concepts are not resourced. TRADOC's integrated and approved listing of force level and proponent/branch level force operating capabilities (FOCs) from these warfighting concepts serve three purposes: as a process control mechanism; authority for supporting studies and experimentation; and a device for linkage between requirements documentation and the warfighting concepts. FOCs are listed biannually in *TRADOC Pamphlet 525–66*.

(5) Requirements generation is the work of integrated concept teams (ICTs), made up of people from multiple disciplines. Their efforts may include concept development or materiel operational requirements development and documentation. DOTMLPF solution sets are documented in ICT minutes or reports. ICTs operate on principals similar to acquisition IPTs (as outlined in *DODI 5000.2*) to identify and resolve issues early. An ICT includes representatives of Army requirements process stakeholders and other principal contributors, including academia and industry, as appropriate. OSD, other services, Combatant Commanders, and JS are invited to send representatives, as appropriate, when their interest is known or suspected.

(6) A materiel requirement is developed for an approved force operating capability (FOC) only after all other possible doctrine, organization, training, leader development, personnel, and facility solutions are deemed unable to solve the FOC. The priority order of consideration is doctrine, organizational design, training, leader development, and finally materiel. When materiel is selected as the best solution, it must be documented. The initial capabilities document (ICD) is the document that initiates the acquisition system management process. ICDs are a non-system-specific statement of operational capability need. The capability development document (CDD) is the document that defines the system capabilities needed to satisfy an approved materiel need, and is developed during phase A, concept and technology development. CDDs are prepared in accordance with *DODI 5000.2* format guidance. As of this update, this new requirements document development, definition, and approval process has not been defined in a revised *CJCSI 3170.01B*.

(7) All ACAT I, IA, II, and III materiel programs have a CDD, except BASOPS materiel that are not warfighting requirements. They can be procured following MACOM standard procurement procedures.

(8) The Joint staff, J–6, conducts an interoperability requirements certification of all ACAT I, IA, II, and III CDDs (*CJCSI 6212.01B*).

(9) All IT products must comply with the Army's operations, systems, and technical architectures (TAs). MACOM information management offices review and ensure compliance with architectures.

(10) Standardization is a key focus of CBTDEVs/TNGDEVs throughout the requirements generation and acquisition management processes. Properly applied, standardization can significantly reduce life-cycle costs, schedules, and risks, while improving quality and logistic support.

(11) Close coordination is maintained between CBTDEVs/TNGDEVs and the S&T community to ensure that technology investments are appropriately focusing on identified FOCs. Periodic reviews are conducted with program offices, laboratories, users, and maintainers to assess the technical status, emerging performance, affordability, and remaining technology shortfalls. M&S are used to preclude unnecessary and impractical development.

(12) All system developments have many capability characteristics that are defined in requirements documentation. KPPs are those system characteristics that define whether or not a system will be capable of mission accomplishment. KPPs are, by definition, characteristics that can cause a concept or system to be reevaluated and a program to be reassessed for restructuring or termination. All CDDs will contain KPPs, which will in turn be documented in the system acquisition program baseline (APB). A KPP addressing interoperability is required (*CJCSI 3170.01B*). For ACAT I systems, KPPs are validated and approved by the JROC even if the authority for CDD has been delegated to the component. The Deputy Chief of Staff, G–3 validates and the CSA approves other KPPs.

(13) When developing system characteristics and performance parameters, cost must be considered on an equal level. In other words, cost is treated as an independent variable along with others used to define a system. This concept - cost as an independent variable (CAIV) - does not preclude consideration and evaluation of a new high potential, leap-ahead but expensive DOTMLPF technology.

11–21. Army science and technology

a. The ultimate goal of the Army's S&T program is to provide the soldier with a winning edge on the battlefield. The accelerating pace of technological change continues to offer significant opportunities to enhance the survivability, lethality, deployability, and versatility of Army forces. High technology R&D is, and will remain, a central feature of the Army's modernization strategy. Key to this modernization strategy is the planned transition of promising technology developments into tomorrow's operational capabilities. Technology demonstrations (TDs), discussed later, which evolve into systems and system upgrades incorporated in the AMP accomplish this transition.

b. The Army's S&T program is an integral part of materiel acquisition. The S&T program consists of three stages - basic research (6.1), applied research (6.2), and advanced technology development (6.3). The identifiers—6.1, 6.2, etc.—are commonly used for identifying funds; but they are also used as a shorthand technique by members of the R&D community to identify levels of research development. For example, instead of referring to some project as being "in applied research," it is often referred to as being "6.2". The 6.1, 6.2, and 6.3 categories are known as the "tech

base". (A MRD is not required for 6.1, 6.2 programs, regardless of size.). Basic research (6.1) includes all efforts of scientific study and experimentation directed toward increasing knowledge and understanding in those fields related to long-term national security needs. Applied research (6.2) includes all efforts directed to the solution of specific military problems, short of major development projects. Advanced technology development (6.3) includes all efforts directed toward projects, which have moved into the development of hardware for testing of operational feasibility. Initiatives, such as the DOD ACTDs, (discussed later in the chapter) obscure the distinction between S&T and development — pre-and post-milestone A activities.

c. The Army Science and Technology Master Plan (ASTMP), approved by the SA and CSA, is the strategic plan for the Army's S&T program. It is the Army's S&T roadmap for achieving Army transformation. This plan is provided to government, industry, and academia to convey the Army's S&T vision, objectives, priorities, and corresponding strategy. This document is explicit, resource-constrained DA guidance to drive funding priorities and the S&T program as a whole. The ASTMP provides "top down" guidance from HQDA to all S&T organizations. It also provides a vital link between DOD technology planning and the Army's MACOMs and laboratories. The core of the Army's S&T strategy is to fuel and exploit the IT explosion; conduct extensive and realistic demonstrations of new technology applications; and provide for early, extensive and continued involvement of warfighters in S&T demonstration programs. S&T programs must be responsive to numerous national security considerations.

d. A mainstay of the Army strategy for military technology is a viable in-house research capability. Laboratories and research, development, engineering centers are the key organizations responsible for technical leadership, scientific advancements and support for the acquisition process. Activities of these organizations range from basic research to the correction of deficiencies in field systems. Academia and industry as well as hands-on bench work contribute to the S&T mission. Technology insertion into systems is accomplished via the flow of patents, data, design criteria, and other information into TDs, ATDs, new designs, and fielded systems.

e. The Army is streamlining the in-house research infrastructure through laboratory consolidation and placing significantly greater reliance on other Services S&T investments. In an effort to make the Army's 21st century R&D efforts more efficient and effective the Lab 21 study was initiated. One of the key elements of Lab 21 was the creation of a world class "flagship" laboratory called the Army Research Laboratory (ARL). Independent Army laboratories have been consolidated into technical directorates under the ARL management umbrella. ARL converted to a federated laboratory system, aligning Army researchers with the best that industry and academia have to offer to support Army transformation to the objective force.

f. Overall, the Army's S&T strategy and programs are committed to the maintenance of technological superiority, while preserving the flexibility to cope with a wide array of possible threat, technology, and budget environments. The Army's investment in S&T is paramount and is playing a greater role in acquisition than ever, particularly since the advent of DOD ACTDs.

g. A series of reviews of current and proposed S&T activities guide focused research. The first is an annual assessment of all proposed Army funded S&T projects. It is conducted based on an appreciation of current capabilities, ongoing S&T activities and their applicability to the force operating capability described earlier in the chapter in *TRADOC Pamphlet 525-66*. Building from the S&T project review, a list of the top 200 Army science and technology objectives candidates—the Army's most important S&T projects—is generated. Based on formal developmental milestones and achievement measures, the Army Science and Technology Working Group (ASTWG) approves each STO, which are then listed in ASTMP. The ASTMP and the AMP provide the basis for ATDs, which showcase a variety of advanced technologies and their potential military merit. In addition to advancing the technology, these S&T activities aid the ICTs to better understand the "art of the possible" and refine the many requirements associated with them.

h. *TRADOC Pamphlet 525-66* also guides independent research & development (IR&D) efforts. By providing the private sector an unclassified, descriptive list of desired FOCs, the Army is able to tap into a wealth of information and new ideas on different means to achieve those capabilities. The Army encourages industry to share these ideas with appropriate CBTDEV and TNGDEV organizations.

i. A special program—Advanced Concept and Technology II (ACT II) program— encourages the application/ demonstration of mature technologies, non-developmental items (NDI), and/or prototypes to address highest priority FOC needs. ACT II funds proposed TDs that, if successful and compelling, may be selected for expedited acquisition or funded through the normal Army acquisition process. ACT II projects are funded at a maximum of \$1.5 million with a planned period of performance not exceeding twelve months. The program is focused on applying mature technologies and unconventional concepts and approaches to address specific FOCs which are solicited annually through a broad agency announcement (BAA). This approach shortens the acquisition cycle and reduces developmental costs. The CSA and ASA (ALT) sponsor ACT II. TRADOC, AMC, and the Army Research Office (ARO) collaborate to build ACT II partnerships between the Army, industry, and the academic community.

j. As with some concepts, S&T research occasionally produces an item that is recognizable as a defined requirement that should be documented and resourced. Most S&T products must be evaluated in warfighting experiments before a decision is made to document them as materiel requirements.

k. Oversight of the S&T program is provided by the Army Science and Technology Advisory Group (ASTAG), which is co-chaired by the AAE and the VCSA (figure 11-5). The Army Science and Technology Working Group

(ASTWG), is co-chaired by the Army S&T executive (the Deputy Assistant Secretary for Research and Technology) and the G-8 Director, Force Development. The ASTWG provides general officer level resolution of pressing S&T issues prior to the ASTAG meetings; recommends to the ASTAG revisions to the Army's S&T vision, strategy, principles, and priorities; and reviews and approves ATDs and STOs.

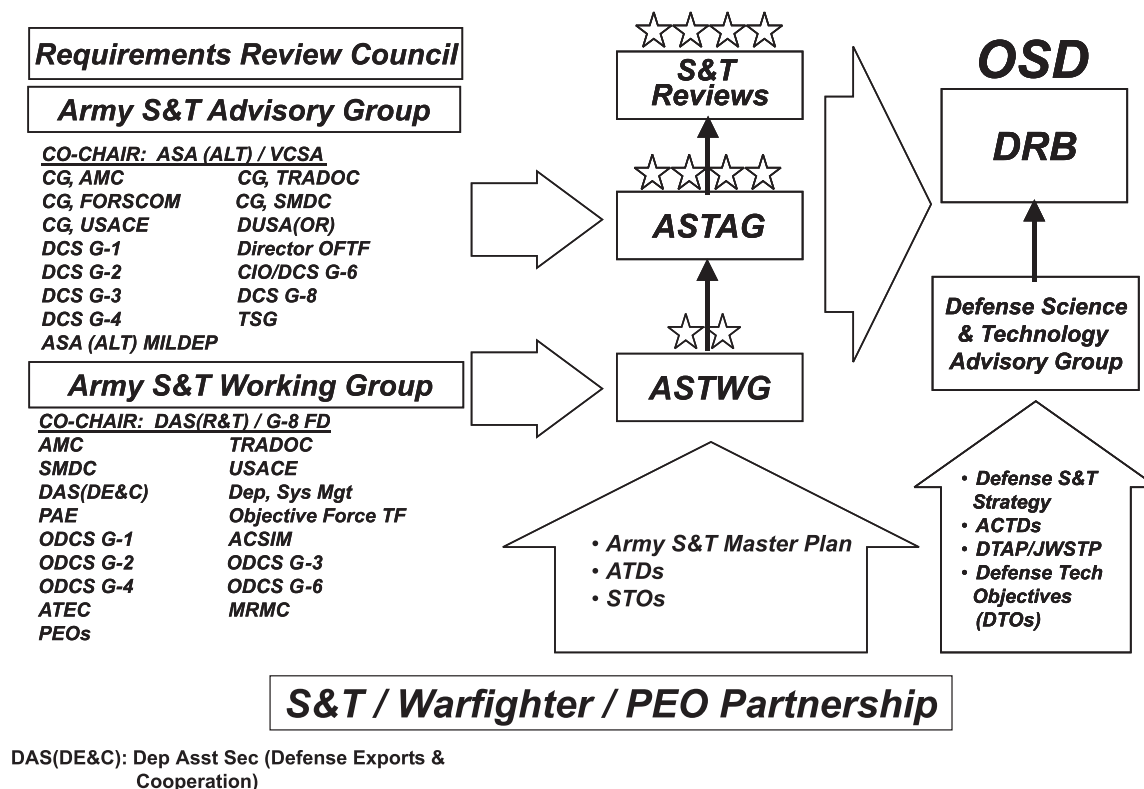


Figure 11-5. Army S&T oversight

11-22. Technology transition strategy

The basic strategy of the S&T program is to transition mature technologies into operational systems that satisfy approved warfighting materiel requirements. Key to this strategy are demonstrations. TDs, ATDs, ACTDs exploit technologies derived from applied research (6.2), which in turn build on new knowledge derived from basic research (6.1) programs. These TDs, ATDs, and ACTDs provide the basis for new systems, system upgrades, or advance concepts which are further out in time. The critical challenge is to tie these programs together in an efficient and effective way. TDs are not new. What is new is the scope and depth of the TDs, the increased importance of their role in the acquisition process, and the increased emphasis on user involvement to permit an early and meaningful evaluation of overall military capability. The following sections provide an explanation of technology maturity, TDs, ATDs, ACTDs, as well as systems/system upgrades.

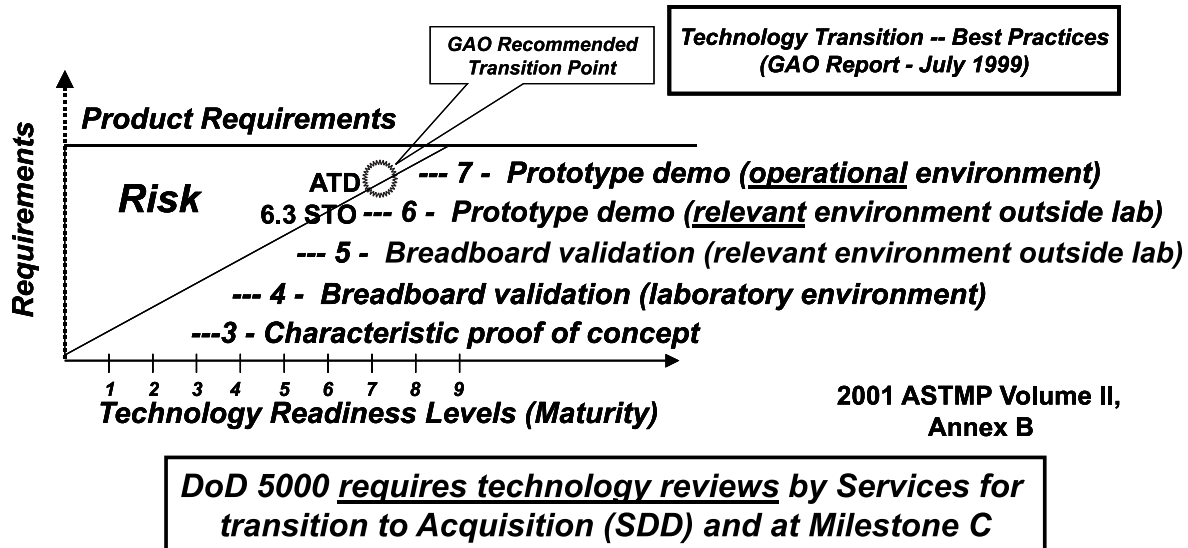
a. Technology maturity. Technology maturity measures the degree to which proposed critical technologies meet program objectives. Technology maturity is a principal element of program risk. A technology readiness assessment (TRA) examines program concepts, technology requirements, and demonstrated technology capabilities to determine technological maturity.

(1) TRAs for critical technologies occur sufficiently prior to milestone decision points B and C to provide useful technology maturity information to the acquisition review process.

(2) The Deputy Assistant Secretary of the Army (Research and Technology) DASA(R&T) directs the TRAs and, for ACAT ID and ACAT IAM programs and submits the findings to the AAE. The AAE submits the report to the Deputy Under Secretary of Defense for Science and Technology (DUSD(S&T)) with a recommended technology readiness level (TRL) for each critical technology. TRLs are depicted in figure 11-6. In cooperation with the DASA(R&T) and the program office, the DUSD(S&T) evaluates the TRAs and, if he/she concurs, forward findings to the OIPT leader

and DAB/ITAB. If the DUSD(S&T) does not concur with the TRA findings, an independent TRA, under the direction of the DUSD(S&T), is required.

- **Defines Technology Maturity in S&T, at Transition, and in Acquisition**



SDD: System Development & Demonstration

Figure 11-6. Technology Readiness Levels (TRLs)

(3) TRLs enable consistent, uniform, discussions of technical maturity, across different types of technologies. Decision authorities must consider the recommended TRLs when assessing program risk. TRLs are a measure of technical maturity. TRL descriptions appear at *Appendix 6, DOD 5000.2R*.

b. Technology Demonstrations (TDs). The primary focus of TDs is to demonstrate the feasibility and practicality of a technology for solving specific military requirements. They are incorporated during the various stages of the 6.2 and 6.3 development process and encourage technical competition. They are most often conducted in a non-operational (lab or field) environment. These demonstrations provide information that reduces uncertainties and subsequent engineering cost, while simultaneously providing valuable development and requirements data.

c. Advanced technology demonstrations (ATDs). Within the DTAP, previously discussed, specific ATDs are structured to meet established goals. Detailed roadmaps to guide their progress are developed, as well as exit criteria to define their goals. ATDs are risk reducing, integrated, "proof of principle" demonstrations designed to assist near-term system developments in satisfying specific operational capability needs. The ATD approach has been promoted by the DSB and the ASB as a means of accelerating the introduction of new technologies into operational systems. They are principally funded with advanced technology development (6.3) funds. ATDs facilitate the integration of proposed technologies into full system integration (6.4) or system demonstration (6.5) prototype systems. As such, they provide the link between the technology developer, PEO, PM, and the Army user. The criteria for establishing an ATD are:

- (1) Execution at the system or major subsystem level in an operational rather than a laboratory environment.
- (2) Potential for new or enhanced military operational capability or cost effectiveness.
- (3) Duration of three to five years.
- (4) Transition plan in place for known and/or potential applications.
- (5) Active participation by TRADOC battle Lab and user proponents.
- (6) Participation by the PM.
- (7) Use of M&S to assess doctrine/tactical payoffs.
- (8) Exit criteria established with user interaction/concurrence.

d. As of this update, the Army has 18 ATDs which have been approved by the ASTWG. More detailed information including exit criteria for each ATD can be found in the *ASTMP* previously discussed.

e. Advanced concept technology demonstrations (ACTDs). The DOD ACTD initiative grew from the 1986 Packard Commission recommendation for rapid prototyping. ACTDs are Joint Service in nature, featuring combatant commanders sponsorship and provide as much as two years of leave-behind (residual) capability in the field. ACTDs apply advanced technologies to joint warfighting requirements to provide an advanced capability in limited time frames. The ACTD is an integrated effort to assemble and demonstrate a significant new military capability, based upon maturing advanced technology(s), in a real-time operation at a scale adequate to clearly establish operational utility and system integrity. ACTDs are jointly sponsored and implemented by the operational user, and MATDEV communities, with approval and oversight guidance from the Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD(AS&C)).

(1) The ACTD concept is a cornerstone in the new AS that relies on prototyping and demonstration programs to allow the U.S. military to maintain their technological edge in the face of declining procurement budgets. ACTDs are a more mature phase of the ATDs. They are two to four year efforts in which new weapons and technologies are developed, prototyped, and then tested by the soldiers in the field for up to two years before being procured.

(2) ACTDs are not new programs, but tend to be a combination of previously identified ATDs, TDs, or concepts already begun. They include high level management and oversight to transform disparate technology development efforts conducted by the various military services into prototype systems that can be tested and eventually fielded. The ACTD becomes the last step in determining whether the military needs and can afford the new technology.

f. Systems and system upgrades.

(1) The development of the next set of materiel systems requires prior demonstration of the feasibility of employing new technologies. "New-start" systems are those next in line after the ones currently fielded or in production. For these systems, most technical barriers to the new capability have been overcome. Generally, these systems can enter system development and demonstration (acquisition system management process phase B) relatively quickly as a result of the successful demonstration of enabling technologies. Based on current funding guidance, the number of "new-start" systems is in a sharp decline.

(2) In the absence of "new-start" systems, the Army is pursuing incremental improvements to existing systems to maintain its technological edge, and capabilities. As defined in the *ASTMP*, these improvements are designated as systems modifications. System modifications are brought about through technology insertion programs (discussed in detail later), service life extension programs (SLEPs), preplanned product improvements (P3I), and block improvement programs. These modifications are based primarily on the success of funded 6.3 ATDs/TDs. The 6.3 ATDs/TDs are either the basis for the system modification or have a high probability of forming the basis for the system modification.

11–23. Warfighting experiments

Warfighting experiments are the heart of DOD/Army's warfighting requirements generation system. Progressive and iterative mixes of high fidelity constructive, virtual and live simulations using real soldiers and units in relevant, tactically competitive scenarios provide Army leaders with FOC insights. Warfighting experiments are conducted to gain understanding about some aspect of future warfighting. Capability insights from warfighting experiments are "way points" used by the Army to plot its future course to the Objective Force. There are four main categories of warfighting experiments — concept experiments, limited objective experiments (LOE), AWE, and joint warfighting experiments (JWE).

a. Concept experiments. The overwhelming majority of warfighting experiments are concept experiments pertaining to TRADOC individual operations or branches. Most concept experiments are conducted as part of the TRADOC CEP. CEP is a separately funded TRADOC initiative that provides quick reaction assessments of the military utility/potential for new or revised DOTMLPF concepts. They are a means to "model-experiment-model" possible requirements and are the building blocks in the "progressive and interactive mix" of simulations. Additionally, they are usually small enough to support the detailed planning and data collection required by the test and evaluation communities. A concept proponent conducts the experiment or requests a battle lab to sponsor it. They either resource it in-house or request resources from HQ, TRADOC.

b. Limited objective experiments (LOEs). LOEs are designed around single events or progressive, iterative simulations with primary relevance to a single issue. LOEs allow the proponent and battle laboratory to conduct low-cost, quick analysis of an issue or to a limited set of issues. LOEs are normally sponsored by one battle laboratory, but there may be several battle laboratories participating in the planning and execution phases of an experiment. LOEs are funded by sources other than the CEP (e.g., within the experimentation campaign plan, school discretionary funds, or by funding from another government agency).

c. Advanced warfighting experiments (AWE). AWEs are the Army's capstone experimentation events focused on a major increase in warfighting capability across multiple branches and the full DOTMLPF spectrum. Any concept proponent recommends the AWE, the TRADOC Commander sponsors it, and the CSA approves and resources it. Today, most AWEs employ live simulations—soldiers and units in field environments. However, live simulations are very expensive, and if they involve new materiel, may occur late in the materiel development cycle. Future warfighting experiments will use a comprehensive suite of reconfigurable simulators and simulations in addition to live simulations.

Distributed interactive simulations (DIS) connected by the Defense simulations internet (DSI) will create a synthetic theater of war (STOW) that enables Army leaders to quickly model, evaluate and change different requirements from any of the DOTMLPF domains. Thus, future warfighting experiments will leverage relatively low-cost models to explore requirements across the DOTMLPF spectrum, reserving expensive field exercises for the final defining event in the requirements generation system.

d. Joint warfighting experiments (JWEs). JWEs are a mechanism for experimenting with systems or systems involving advanced technologies prior to commitment to acquisition programs. They are conducted as part of joint warfighting exercises. A JWE is a snapshot in time when prototypes from ATDs, ACTDs, development programs and technology base efforts are integrated to permit the warfighter to evaluate their combined potential and gain insight into future advanced joint warfighting concepts. JWEs are DOD-wide efforts to support the horizontal integration and synchronization of advanced technologies from ACTDs, ATDs, and advanced distributed simulation products for experimentation in joint warfighting exercises, such as the July 2002 *Millennium Challenge 2002* JWE sponsored by the Commander, USJFCOM. Warfighting experiments provide an unsurpassed means to understand future warfighting requirements. Planned and executed with the entire combined arms team and appropriate other Service elements, warfighting experiments open the "windows to the future". Understanding the cost and benefits of change across the force and in all domains allows us to "maintain the edge" and conserve resources at the same time.

Section V

Materiel requirements documents (MRDs)

11–24. Generating and documenting materiel requirements

MRDs establish the need for a materiel acquisition program, how the materiel will be employed, and what the materiel must be capable of doing. As the acquisition program progresses, statements of required performance and design specifications become more and more specific. The mission area focused initial capabilities document ICD (previously discussed) is the document that initiates the acquisition system management process. The capability development document (CDD) and the capability production document (CPD) are the documents that define the system capabilities needed to satisfy an approved materiel need. The CDD is developed during phase A, concept and technology development prior to milestone B (program initiation). The CPD is developed during phase B, system development and demonstration, prior to milestone C (LRIP approval).

11–25. Capability Development Document (CDD) / Capability Production Document (CPD).

a. Each concept proposed at MS B is described in a CDD in terms of minimum acceptable operational performance requirements (thresholds) that defines the system capabilities needed to satisfy a validated materiel need. When appropriate, objectives for each parameter representing a measurable, beneficial increment in operational capability or operations and support are established. Objectives should not be stated if they cannot be supported with operational rationale.

b. ACAT ID and IAM CDDs are approved by the JROC unless previously delegated. All other Army-generated CDDs are approved by HQDA. CDDs are refined and expanded for MS C in a CPD, to include thresholds and objectives for more detailed and refined performance capabilities and characteristics based on the results of trade-off studies and testing conducted during phase B. After MS C, CDDs/CPDs are only refined when there is a change in the mission need or the CBTDEV/TNGDEV determines a need to significantly change the performance envelope represented by the CDDs/CPDs minimum acceptable value (threshold) requirements. The MATDEV uses the CDDs/CPDs to develop system performance requirements for contract specifications during each acquisition phase.

c. CDDs/CPDs specify at least two levels of performance characteristics, minimum acceptable value (threshold) requirement and objective requirement (*DODI 5000.2* and *CJCSI 3170.01B*). The objective requirement for parameters is provided only when the CBTDEV/TNGDEV desire a relevant and operationally significant capability above the threshold requirement. CDDs identify recommended KPPs to appropriately focus the acquisition effort and decision-making. CDDs/CPDs are adjusted only after the CBTDEV or TNGDEV, as appropriate, and the MATDEV agree that such changes are necessary to authorize development of the system or TADSS to the required capability.

d. CDD/CPD format and content are not defined as of this update pending revision of *CJCSI 3170.01B*.

11–26. Operational need statement (ONS).

Operational field commanders use an ONS to document the urgent need for a materiel solution to correct a deficiency or to improve a capability that impacts upon mission accomplishment. The ONS provides an opportunity to the field commander, outside of the acquisition and CBTDEV/TNGDEV communities, to initiate the requirements generation system (RGS). The ONS is not a MRD. The CBTDEV, TNGDEV or MATDEV communities do not initiate or develop an ONS. Response to an ONS varies depending on the criticality of the need for the proposed item. Response can range from a HQDA directed requirement and fielding of a materiel system to the forwarding of the action to TRADOC for review and routine action. HQDA may decline to favorably consider an ONS for a variety of reasons, including conflicting needs, higher priorities for funding, existence of a similar system, or nonconcurrence of the criticality of the need. The response to an ONS is based on an ARSTAF validation supported by TRADOC, AMC, and

MATDEV reviews. ODCS, G-3 (DAMO-RQ) determines validity of the need, availability of technology, and source of resources to fill this requirement. If the need is determined to be critical, and can be resourced (at least for the present situation) a directed requirement may result. If no solution is available or if the need is not urgent or critical the ONS will be turned over to CBTDEVs, TNGDEVs and MATDEVs to find solution. All ONS are reviewed by the CBTDEVs/TNGDEVs to determine applicability to future requirements or continuing need for which a standard requirement (CDD) and acquisition is needed. If validation of the ONS indicates that the concept has potential for Army-wide application and development of a new system is appropriate, TRADOC will initiate a mission area ICD and/or CDD as appropriate. If validation indicates that there exists a specific limited but necessary critical need, HQDA may issue a directed requirement for ONS having Army-wide application; however, tailored development and standard documentation should be used in this instance. The ONS process may shorten NDI acquisition by shortcutting the RGS enroute to a buy decision; however, the ONS is more important to users because it starts the RGS moving in the absence of any other impetus.

Section VI

Materiel requirements approval process

On March 19, 2001 and again on January 15, 2002, the Army revised its warfighting requirements approval process to adjust for rapidly changing technology, constraints on the Army budget, increased sustainment costs, the need to provide a concrete linkage between requirements and resources, and increasing emphasis on Joint interoperability. Establishment of the requirements staff officer (SSO) in the ODCS, G-3 is clearly intended to support the need for a concrete linkage between requirements and resources. Within the Army, the CSA retains approval authority for all warfighting materiel requirements (CDDs regardless of ACAT level). Major warfighting concepts designed to guide force modernization, (e.g., Unit of Action (UA) or higher level operational and organizational (O&O) concepts) are also approved by the CSA. Requirements meeting specific threshold criteria may be approved by the VCSA or the DCS, G-3, in order to facilitate timely processing, if delegated by CSA.

11-27. Requirements approval

In order to provide more effective management of the total requirements process for all aspects of Army needs, the requirements process was modified to consolidate all DOTMLPF requirements at HQDA for staffing, validation, and approval. This process ensures the Army pursues requirements that can compete for and retain resources tied to the future Army and Joint visions and goals. The changes to the current Army RGS are evolutionary. The new process places increased emphasis on requirements analysis, identifying potential alternatives, affordability, and Joint interoperability. The goal is to evaluate all DOTMLPF requirements, regardless of origin, against the goals, vision and needs of the current and future force. The lead organization for the implementation of the RGS process is HQDA ODCS, G-3. Within the ODCS, G3, the Requirements Directorate (DAMO-RQ) is the single entry point for all Army and Joint DOTMLPF requirements. As previously discussed, DAMO-RQ is the proponent for policy development and RGS process oversight. Within DAMO-RQ, the RSO is directly responsible for leading HQDA staff integration and coordination efforts for all Army and Joint DOTMLPF requirements issues within the RGS process. The RSO coordinates with his/her ODCS, G8 counterpart, the SSO, to facilitate the transition from requirements development and approval to requirements solutions (execution and resourcing).

11-28. Army requirements oversight council (AROC)

a. The AROC, coordinated by ODCS, G-3 (DAMO-RQ), is assigned responsibility for advising and making recommendations on the disposition of MRDs to the CSA. DAMO-RQ schedules and executes the AROC forum. TRADOC continues to be responsible for balanced development of concepts, requirements, and products in DOTMLPF. CG TRADOC's evaluation and recommendation must accompany all requirements submitted to HQDA for CSA approval.

b. The AROC reviews requirements documents for military need and risk; synchronization with AMP and TCP; program affordability; and program definition and interoperability. In reviewing for military need and risk, the AROC seeks to validate that:

(1) Deficiencies cannot be corrected by nonmateriel means, such as changes to doctrine, organizations, training, leader development, personnel, or facilities;

(2) Suitable, lesser cost, materiel alternatives do not exist; and

(3) Failure to pursue the program will result in an unacceptable risk to the Army's warfighting capabilities. The AROC also considers the execution risk to ensure capabilities can be available to the field in the timeframe required. The AROC review validates the recommended strategy for CDD documents is consistent with AMPs, and contributes to a balanced, synchronized modernization program. The AROC reviews cost and affordability of concepts and programs to ensure that they are within budgeting and programming limits for short and long term. This includes potential supportability requirements for the concept or system. The AROC ensures that the O&O definition of the system (CDD) is clear, and consistent with Army warfighting concepts. The AROC reviews the KPPs for the system and ensures the proposed system meets Army and Joint interoperability requirements.

c. The AROC may not review all Army requirements. Selected documentation approval may be delegated to the

VCSA or the DCS, G-3 by the CSA. CSA retains disapproval authority. In addition a "paper AROC" may be used, at the discretion of the AROC chair, to staff un-contentious issues with approval by the CSA, or as delegated to the VCSA or the DCS, G-3. An information copy of all issues approved by the VCSA or the DCS, G-3 is provided to the CSA.

d. The AROC makes one of the following six dispositions of the CDD. For documents where CDD approval authority is the Army:

- (1) Recommend approval and HQDA retention of control over any future changes for the document.
- (2) Recommend approval and HQDA retention of control over future changes to KPPs. This provides CG, TRADOC authority to modify non-KPP requirements in the CDD.
- (3) Recommend approval and delegation of future changes to the document to CG, TRADOC. In each of these three instances the AROC recommendation can be with or without AROC modification. For documents requiring JROC action:
- (4) Recommend approval (with or without AROC modification), and forward to the JROC (all potential ACAT I CDDs; all IT systems; and JROC special interest items). And for all documents:
- (5) Return the document to the ARSTAF for additional development, and
- (6) Recommend disapproval. ODCS, G-3 RSOs are the lead in taking requirements documents through the AROC and RRC processes.

e. The AROC consists the following permanent members:

- (1) Vice, Chief of Staff, Army (Chair)
- (2) Military Deputy, Office of the Assistant Secretary of Army (Acquisition, Logistics, and Technology) (ASA(ALT))
- (3) Chief Information Officer (CIO)/Deputy Chief of Staff, G-6
- (4) Deputy Under Secretary of the Army (Operations Research) (DUSA(OR))
- (5) Deputy Chief of Staff, G-1
- (6) Deputy Chief of Staff, G-2
- (7) Deputy Chief of Staff, G-3
- (8) Deputy Chief of Staff, G-4
- (9) Deputy Chief of Staff, G-8, and
- (10) HQ, TRADOC Deputy Chief of Staff for Developments.

11-29. Requirements review council (RRC)

a. The RRC was established in 1987 to ensure senior Army leadership consensus on major issues affecting the current and future direction of the Army. These issues include, but are not limited to, emerging operational concepts, review of operational requirements and programs, critical equipping issues, and other force modernization issues. There are two types of RRCs: requirements RRC and S&T RRC. The RRC is the CSA's primary decision-making forum for transformation and focuses on the Objective Force. The S&T RRC is primarily an information forum and focuses on the technical aspects of transforming to the Objective Force. IAW the Objective Force Task Force (OF TF) charter, OF TF presents briefings at the S&T RRC, as directed by the CSA.

b. The outcome of the RRCs is open discussion among senior Army leaders on issues affecting the future and direction of the Army. All major warfighting concepts designed to guide force modernization are briefed to the RRC for approval. They are reviewed by the RRC for synchronization with the Army modernization strategy and affordability, as well as the concept itself. In addition, the CSA directs which requirements documents will be reviewed by the RRC after recommendation from the AROC. These are reviewed to ensure senior leadership consensus on the direction of significant materiel issues.

c. The ADCS, G-3 is the proponent for scheduling and executing the RRC and S&T RRC. DAMO-ZT is responsible for scheduling and coordinating all RRC topics. DAMO-RQ supports DAMO-ZT by coordinating meeting attendance; developing and promulgating RRC administrative procedures; and documenting decisions, taskings and other directives from the RRC. DAMO-RQ provides instructions to appropriate action offices on briefing requirements beginning with the approval of the RRC topics by the CSA. Both the RRC and S&T RRC meet once a month unless otherwise directed by the CSA.

11-30. Approval process procedures

a. All Army and Joint DOTMLPF requirements (including ONS, priority changes, and accelerations), regardless of origin, are submitted to ODCS, G-3, DAMO-RQ, Policy and Procedures Branch.

b. DAMO-RQ reviews the requirements document for appropriate content, completeness, and determines the correct staffing channel.

c. DAMO-RQ staffs documents and forwards the requirement documents to the appropriate RSO team.

d. The RSO convenes the requirements team from across the ARSTAF to analyze, coordinate, refine and develop

recommendations for the requirement. The requirements team facilitates requirements document changes as appropriate. The RSO convenes subsequent requirements team meetings as necessary.

e. The RSO consolidates requirements team comments, develops a recommendation package, and returns recommendations to the DAMO-RQ who ensures completeness of the packet, formulates the recommendation, and forwards the requirements packet thru the Director of Requirements to the ADCS, G-3.

f. The ADCS, G-3 approves the recommendation or directs further development.

g. The ADCS, G-3 determines the approval channel. DAMO-RQ submits requirements to the ARSTAF for the 3-Star review at the direction of the ADCS, G-3.

h. The 3-Star review provides the final formal ARSTAF recommendation on the requirement.

i. Upon completion of the 3-Star review, the requirements packet is returned to the ADCS, G-3 for final coordination with DAMO-ZR regarding 1-N list priority. DAMO-RQ routes the packet to the appropriate approval authority or venue depending upon threshold decision.

j. The CSA approved requirements are either JROC threshold or non-JROC threshold. For JROC threshold requirements, DAMO-RQ coordinates the requirements document through the Office of Joint and Defense Affairs (OJDA) with the JS via the Joint C4I Process Assessment Tool (JCPAT) system. If not JROC threshold, DAMO-RQ issues CSA tasking to ODCS, G-8 Dir, FD for programming and fielding solutions across DOTMLPF.

k. If the requirement cannot be met for specific issues, the requirement is returned to the ADCS, G-3 for reconsideration by the CSA.

l. Over time, changes to a requirement or the inability to sustain a CSA approved requirement results in a notification by the solution proponent through the ODCS, G-8 to the ODCS, G-3. Resulting actions include: restaffing, reprioritizing, modifying, or killing the requirement.

Note. Note: CSA approves any modification to approved requirements.

m. The materiel requirements approval / program initiation process is shown in figure 11-7.

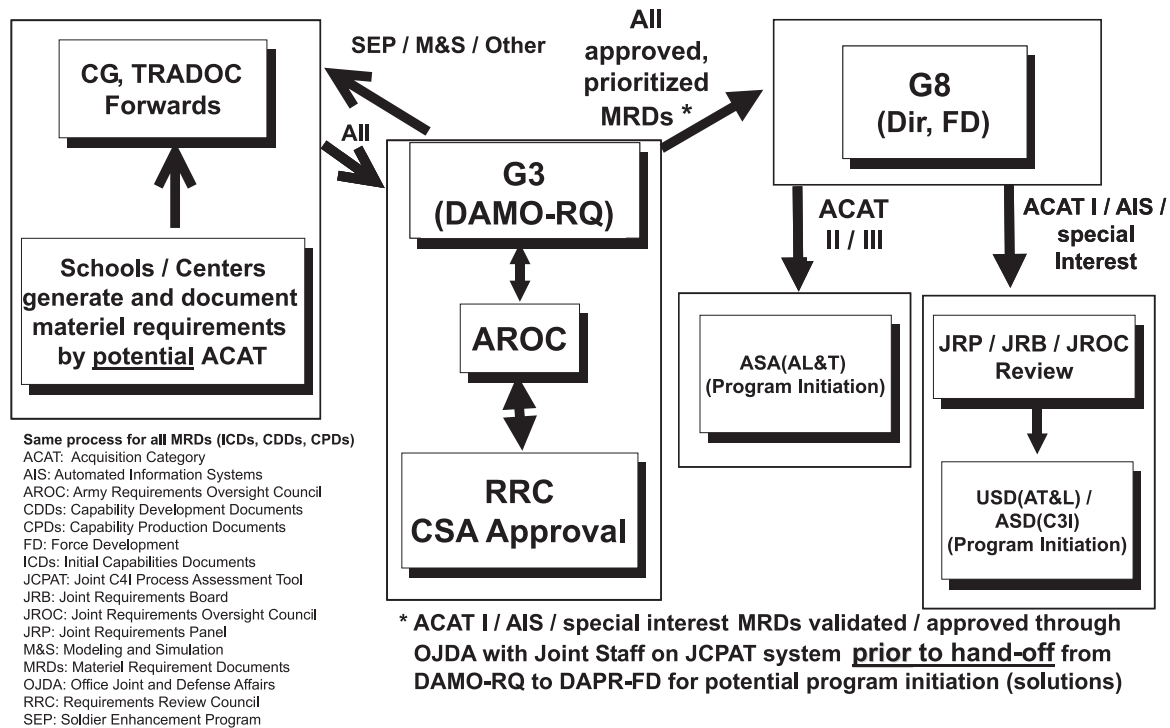


Figure 11-7. Materiel requirements approval/program initiation process

Section VII

Material systems acquisition management process

The Defense acquisition system establishes a management process to translate user needs and technological opportunities into reliable and sustainable systems that provide capability to the user. User needs are broadly stated mission needs responding to a postulated threat and developed in the RGS, or business needs responding to new ways of doing business, and developed by the appropriate staff office. Technological opportunities are developed or identified in the S&T program based on user needs.

11–31. Materiel systems acquisition management

a. The materiel systems acquisition management process is a continuum composed of three activities with multiple paths into and out of each activity. Technologies are researched, developed, or procured in pre-system acquisition (S&T and concept development and demonstration). Systems are developed, demonstrated, produced or procured, and deployed in systems acquisition. The outcome of systems acquisition is a system that represents a judicious balance of cost, schedule, and performance in response to the user's expressed need; interoperable with other systems (U.S., Coalition, and Allied systems, as specified in the CDD); uses proven technology, open systems design, available manufacturing capabilities or services, and smart competition; affordable; and is supportable. Once deployed, the system is supported throughout its operational life and eventual disposal in post-systems acquisition using prudent combinations of organic and contractor service providers, in accordance with applicable statutes.

b. Key policies and principles governing the operation of the Defense acquisition system are:

(1) Decentralize responsibility. Responsibility for systems acquisition shall be decentralized to the maximum extent practicable. A single individual shall be provided sufficient authority to accomplish program objectives for development, production, and sustainment. The MDA shall ensure accountability and maximize credibility in cost, schedule, and performance reporting.

(2) Tailoring. There is no one best way to structure an acquisition program so that it accomplishes the objectives of the Defense Acquisition System. Decision-makers and program/project/product managers (PMs) shall tailor various aspects of the acquisition system, including program documentation, acquisition phases, the timing and scope of decision reviews, decision levels, and acquisition strategies to fit the particular conditions of an individual program. The objective is to minimize the time it takes to satisfy the validated need or exploit the technology opportunity, consistent with common sense, using sound business management practices, applicable laws and regulations, while considering the time-sensitive nature of the user's requirement. MDAs shall promote flexible approaches to oversight and review based on mutual trust and a program's dollar value, risk, and complexity.

(3) Innovation, continuous improvement, and lessons learned. The Department shall continuously develop and implement initiatives to streamline and improve the Defense Acquisition System. Decision-makers at all levels shall encourage the continuous examination and adoption of innovative practices - including best commercial practices and electronic business solutions - which reduce cycle time and cost, and encourage teamwork. Decision makers shall provide meaningful incentives for innovation, such as reinvestment of cost savings and career recognition and advancement as a means to facilitate continuous process improvement and innovation. In addition, decision-makers at all levels shall encourage and facilitate documentation and institutionalization of lessons learned.

(4) Technology development and transition. The S&T program shall address user needs; maintain a broad-based program spanning all Defense-relevant sciences and technologies to anticipate future needs and those not being pursued by civil or commercial communities; preserve long-range research; and enable rapid successful transition from the S&T base to useful military products.

(5) Reduced cycle time. Advanced technology shall be integrated into producible systems and deployed in the shortest time practicable. Validated, time-phased requirements matched with projected capability needs and available technology support the development of evolutionary acquisition strategies. Evolutionary acquisition strategies shall be the preferred approach to satisfying operational needs. Spiral development shall be the preferred process.

(6) Collaboration. The Defense acquisition, requirements, and financial communities shall maintain continuous and effective communications with each other and with the operational user through the use of IPTs. Teaming among warfighters, users, developers, acquirers, technologists, industry, testers, budgeters, and sustainers shall begin during requirements definition. PMs and MDAs shall be responsible for making decisions and leading implementation of their programs, and are accountable for results.

(7) Interoperability. Interoperability is the ability of systems, units, or forces to provide data, information, materiel, and services to and accept the same from other systems, units, or forces, and to use the data, information, materiel, and services so exchanged to enable them to operate effectively together. Interoperability shall apply within and among United States forces and U.S. coalition partners. Mission-area-focused, integrated architectures shall be used to characterize these interrelationships. DOD policy for interoperability and supportability of IT, including National Security Systems appears in *DOD Directive 4630.5*.

(8) Information superiority. The Defense acquisition community shall provide U.S. forces with systems and families of systems that are secure, reliable, interoperable, and able to communicate across a universal IT infrastructure, including National Security Systems, consisting of data, information, processes, organizational interactions, skills, analytical expertise, other systems, networks, and information exchange capabilities.

(9) Intelligence support. Intelligence, and understanding threat capabilities, is integral to system development and acquisition decisions. Threat capabilities shall be kept current and validated in program documents throughout the acquisition process.

(10) Performance-based acquisition. In order to maximize competition, innovation, and interoperability, and to enable greater flexibility in capitalizing on commercial technologies to reduce costs, performance-based strategies for the acquisition and sustainment of products and services shall be considered and used whenever practical. For products, this includes all new procurements and major modifications and upgrades, as well as the reprocurement of systems, subsystems, and spares that are procured beyond the initial production contract award. When using performance-based strategies, contractual requirements shall be stated in performance terms, limiting the use of military specifications and standards to Government-unique requirements only. Configuration management decisions shall be based on factors that best support implementation of performance-based strategies throughout the product life-cycle.

(11) Knowledge-based acquisition. Knowledge about key aspects of a system shall be demonstrated by the time decisions are to be made. Technology risk shall be reduced and technologies shall have been demonstrated in a relevant environment, with alternatives identified, prior to program initiation. Integration risk shall be reduced and product design demonstrated prior to critical design review. Manufacturing risk shall be reduced and producibility demonstrated prior to full-rate production.

(12) Integrated test and evaluation (T&E). T&E shall be integrated throughout the defense acquisition process. T&E shall be structured to provide essential information to decision-makers, assess attainment of technical performance parameters, and determine whether systems are operationally effective, suitable, and survivable for intended use. The conduct of T&E, integrated with M&S, shall facilitate learning, assess technical maturity and interoperability, facilitate integration into fielded forces, and confirm performance.

(13) Total systems approach. The PM shall be the single point of accountability for accomplishment of program objectives for total life-cycle systems management, including sustainment. The PM shall adopt a human systems integration approach to optimize total system performance (hardware, software, and human) and when assessing system effectiveness, suitability, and survivability. Planning for operation and support shall begin as early as possible.

(14) Performance-based logistics. PMs shall develop and implement performance-based logistics strategies that optimize total system availability while minimizing cost and logistics footprint. Sustainment strategies shall include the best use of public and private sector capabilities through government/industry partnering initiatives, in accordance with statutory requirements.

(15) Program goals. PMs shall implement management controls. Every acquisition program shall establish program goals for the minimum number of cost, schedule, and performance parameters that describe the program over its life-cycle. Approved program baseline parameters shall serve as control objectives. PMs shall identify deviations from approved APB parameters and exit criteria as material weaknesses.

(16) Cost and affordability. Fiscal constraint is a reality that all participants in the acquisition system must recognize. Cost shall be viewed as an independent variable, and the DOD Components shall plan programs based on realistic resource projections of dollars and manpower likely to be available in future years. To the greatest extent possible, the DOD Components shall identify the total costs of ownership, and at a minimum, the major drivers of total ownership costs. The user shall treat cost as a military requirement and state the amount the Department should be willing to invest to obtain, operate, and support the needed capability over its expected life cycle.

(17) Independent Operational Test Agency (OTA). Each Military Department shall establish an independent OTA, reporting directly to the Service Chief, to plan and conduct OTs, report results, and provide evaluations of effectiveness, suitability, and survivability. ATEC, previously discussed, is the Army's OTA.

c. Technology projects (e.g., ATDs, ACTDs, JWEs and concepts exploration) are efforts that occur prior to acquisition program initiation. These are referred to as pre-ACAT technology projects. The MDA for projects which will likely result in a MDAP, if successful, is the USD(AT&L). Those projects likely to result in a MAIS, if successful, the MDA is the Assistant Secretary of Defense (Command, Control, Communications and Information (ASD(C3I))).

d. The materiel acquisition (RDA) process is initiated as a result of output—approved warfighting materiel requirements—from the RGS, previously discussed, efforts of the CBTDEV. Identified warfighting requirements are first assessed to determine if they can be satisfied by nonmateriel solutions. Non-materiel solutions include changes in doctrine, organization, training, leader development, personnel and facilities (DOTLPPF). A new development materiel program is initiated only if these non-materiel solutions will not satisfactorily overcome the deficiency. A hierarchy of potential materiel alternatives (strategies) must be considered before committing to a new start acquisition program. In order of preference, the DOD directed materiel alternatives are:

- Procurement/modification of commercially available products, services, and technologies, from domestic or international sources, or the development of dual-use technologies;
- Additional production/ modification of previously developed U.S. and/or Allied military systems or equipment;

- A cooperative development program with one or more Allied nations;
- A new joint component or government agency development program; and
- A new component-unique development program.

e. In the broad sense, the acquisition process consists of a series of management decisions made in DOD or the Army as the development of a materiel system progresses from a stated materiel requirement to a fielded system. PIs to existing systems or acquisition of NDI usually occurs through acquisition streamlining (discussed later in the chapter). The framework used in the materiel acquisition process is shown in figure 11–8. A key aspect of the materiel acquisition process is that it is divided into three distinct activities (pre-systems acquisition, systems acquisition, sustainment); four phases (concept and technology development, system development and demonstration, production and deployment, and sustainment); and eight work efforts (concept exploration, technology development, system integration, system demonstration, low rate initial production (LRIP), full rate production (FRP) and deployment, operational support, and disposal). Entry into the acquisition process is at one of the decision points, called milestones, dependent on the demonstrated technological maturity of the alternative selected.

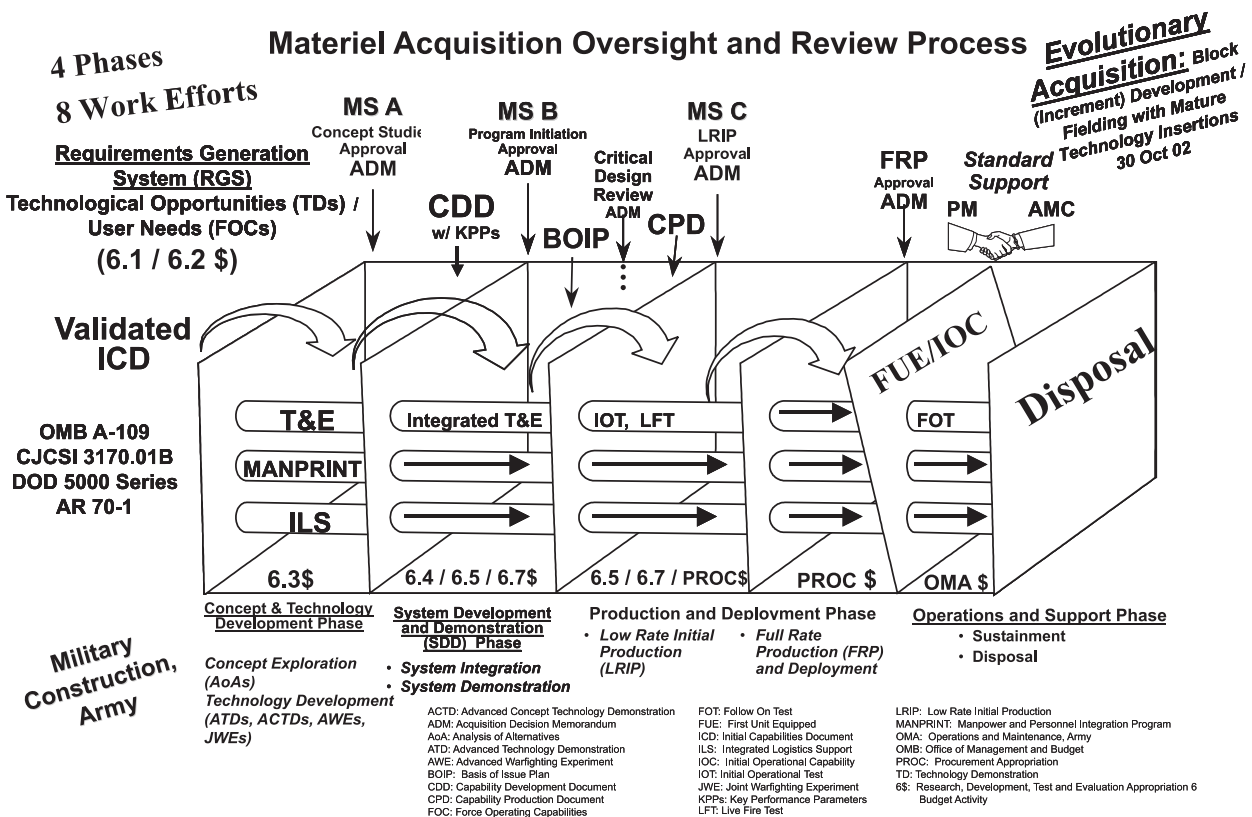


Figure 11–8. System acquisition management process

11–32. Acquisition categories

When the materiel requirement and manner of acquisition have been identified, the acquisition is designated as ACAT I–III. This category determines the level of review, and who will make the milestone decisions. Dollar criteria and visibility of the potential program determine the ACAT. There are three acquisition categories, as shown in figures 11–3a and 11–3b.

11–33. Acquisition strategies and program plans

a. The acquisition strategy (AS) is the framework (roadmap) for planning, directing, and managing an acquisition program to satisfy an approved materiel requirement. Acquisition strategies and their supporting program plans are tailored to accomplish established program objectives and to control (reduce or minimize) risk. They must also provide

How the Army Runs

the information essential for milestone decisions. In this regard, acquisition strategies are event-driven and explicitly link major contractual commitments and milestone decisions to demonstrated accomplishments in development and testing.

b. Program plans provide for a systems engineering approach to the simultaneous design of the product and its associated manufacturing, test, and support processes. This concurrent engineering approach is essential to achieving a careful balance among system design requirements (for example, operational performance, producibility, reliability, maintainability, logistics and human factors engineering, safety, survivability, interoperability, and standardization). Maximum practicable use is made of commercial and other nondevelopmental items. The Army's first preference is to use performance specifications, the next is to use non-government standards (NGS), and as a last resort military specifications and standards (MILSPECs/STDs) may be used. Use of MILSPECs/STDs requires a waiver from the MDA. Additionally, changes to DODI 5000.2 resulting from the *Federal Acquisition Streamlining Act (FASTA) of 1994* state the AS should be tailored to the extent feasible to employ commercial practices when purchasing commercial products or other nondevelopmental items.

c. Cost as an independent variable (CAIV). CAIV is the DOD cost reduction methodology utilized throughout the entire life-cycle of a programs acquisition process to ensure operational capability of the total force is maximized for the given modernization investment. In other words, cost is treated as an independent variable along with others used to define a system. Cost performance analysis is conducted on a continuous basis throughout the life-cycle. CAIV directly impacts the preparation of a program's requirements documents (ICDs/CDDs/CPDs), as well as acquisition documents (AS and APB).

11-34. Environmental considerations

Environmental impact is always considered in Defense acquisitions. The *National Environmental Policy Act (NEPA) of 1969* mandates analysis of potential environmental effects of proposed federal actions. For materiel acquisitions, NEPA compliance before development begins; continuous environmental analyses; accounting for all direct, indirect, and cumulative environmental impacts. NEPA compliance should begin as early in the acquisition process as possible and continue throughout the process to support production, testing, and fielding of system. The NEPA documentation process can be lengthy and costly, but environmental issues and concerns represent a risk to the program that must be managed. Inadequate environmental analyses can lead to dramatic increases to overall program costs, will certainly delay testing and fielding schedules, and may produce a system that cannot be operated or maintained at the location where soldiers need it most. Early consideration of environmental impacts and NEPA requirements help protect not only the environment, but helps ensure a well-trained soldier.

11-35. Risk assessments and management

Program risks and risk management plans are explicitly assessed at each milestone decision point prior to granting approval to proceed into the next acquisition phase. Risks must be well understood, and risk management approaches developed, before MDAs can authorize a program to proceed into the next phase of the acquisition process. To assess and manage risk, MATDEVs use a variety of techniques. They include TDs, prototyping, and T&E. Risk management encompasses identification, mitigation, and continuous tracking and control procedures that feed back through the program assessment process to decision authorities. PMs, and other MATDEVs include a risk management approach in selecting the best contracting method appropriate to the type system being developed and acquired.

Section VIII

Acquisition activities, phases and milestones

11-36. Pre-systems acquisition activity

Pre-system acquisition is composed of on-going activities in development of user needs, in S&T, and in concept development work specific to the development of a materiel solution to an identified, validated materiel requirement.

11-37. Concept and technology development phase

One path into systems acquisition begins with examining alternative concepts to meet a stated mission need. This path begins with a decision to enter concept and technology development at milestone A. The phase ends with a selection of an integrated architecture and the completion of entrance criteria into milestone B and system development and demonstration phase.

11-38. Entrance criteria for concept development and exploration

a. The CSA approves all warfighting requirements. All Army warfighting requirements in the form of mission area initial capabilities documents (ICDs) and capability development documents (CDDs) are submitted to HQDA for validation or approval. This applies to all requirement documents, regardless of potential ACAT level. In this context, Army warfighting requirements include Joint and other Service requirements with Army participation or interest. The Army Requirements Oversight Council (AROC) was established to advise the CSA on Army warfighting requirements.

b. While a materiel alternative may enter acquisition at multiple points, the appropriate point is guided by the ability

to satisfy stated entrance criteria (minimum accomplishments required to be completed prior to entry into the next phase), the content of each work effort within a phase, and the considerations at each applicable milestone. After HQDA validates and approves a MRD, the MDA (through the ICT process) reviews the MRD, considers possible technology issues (e.g., technologies demonstrated in ATDs), and identifies possible alternatives before making a milestone A decision, based on an analysis of potential concepts (alternatives) to be studied, and considering cooperative opportunities.

11–39. Milestone A

At milestone A, the MDA approves the initiation of concept studies, designates a lead agency, approves concept exploration exit criteria, and issues the acquisition decision memorandum (ADM) (see para 11–66). The leader of the CBTDEV-led ICT, working with the integrated test team, develops an evaluation strategy that describes how the capabilities in the MRD will be evaluated once the system is developed. For potential ACAT I programs, the integrated evaluation strategy is approved by the DOD Director, Operational Test and Evaluation (DOT&E) and the cognizant OIPT. A favorable milestone A decision **DOES NOT** yet mean that a new acquisition program has been initiated. Milestone A approval can lead to concept exploration or technology development depending on whether an evaluation of multiple concepts is desired or if a concept has been chosen. However, more work is needed on key sub-systems or components before a system architecture can be determined and the technologies can be demonstrated in a relevant environment.

11–40. Concept exploration work effort

a. Concept exploration typically consists of competitive, parallel, short-term concept studies. The focus of these efforts is to refine and evaluate the feasibility of alternative concepts and to provide a basis for assessing the relative merits (e.g., advantages and disadvantages, degree of risk, etc.) of these concepts. The analysis of alternatives, discussed later in the chapter, is used to facilitate comparisons of alternative concepts. In order to achieve the best possible system solution, emphasis is placed on innovation and competition. To this end, participation by a diversified range of businesses (e.g., small, new, domestic, and international) is encouraged. Alternative system design concepts are primarily solicited from private industry and, where appropriate, from organic activities, international technology and equipment firms, Federal laboratories, federally funded R&D centers, educational institutions, and other not-for-profit organizations. The work in concept exploration is normally funded only for completion of concept studies contracts. The work is guided by a validated and approved ICD.

b. The most promising system concepts are defined in terms of initial, broad objectives for cost, schedule, performance, and supportability; identification of interoperability, security, survivability, operational continuity, technology protection, operational support, and infrastructure requirements within a family of systems; opportunities for tradeoffs, and an overall AS and T&E strategy (including development test (DT), OT, and live fire testing (LFT)). This work effort ends when the MDA selects the preferred concept (alternative) to be pursued.

11–41. Technology development work effort

The project shall enter technology development when the ICT leader has a concept for the needed capability, but does not yet know the system architecture. Unless otherwise determined by the MDA, the component technology to be developed shall have been proven in concept. The project shall exit technology development when an integrated architecture has been developed, when an affordable increment of militarily-useful capability has been identified, the technology for that increment has been demonstrated in the relevant environment, and a system can be developed for production within a short timeframe (normally less than five years). The project can also exit technology development in the event the MDA decides to end the effort. Technology development is intended to reduce risk on components and subsystems that have only been demonstrated in a laboratory environment. It is also used to determine the appropriate set of subsystems to be integrated into a full system. This work effort normally is funded only for the advanced development work. The work effort is guided by the validated and approved ICD, but during this activity, a CDD is developed by the CBTDEV-led ICT to support program initiation and refine the integrated architecture. Also, acquisition information necessary for a milestone decision (e.g., the AS, program protection plan, etc.) is developed. This effort is normally followed by entry into the system development and demonstration phase after a milestone B decision by the MDA.

11–42. Systems acquisition activity

Systems acquisition is the process of developing concepts into producible and deployable products that provide capability to the user. The concept to exploit in systems acquisition is based on an analysis of alternative (AoA) to meet the military need (done either in concept exploration or technology development), including commercial and non-developmental technologies and products and services determined through market analysis. The CBTDEV responsible for the mission area in which a deficiency or opportunity has been identified normally prepares the AoA. (The MATDEV does not prepare the AoA.) The goal is to develop the best overall value solution over the system's life cycle that meets the user's operational requirements. If existing systems cannot be economically used or modified to meet the operational requirement, an acquisition program may be justified and decision-makers follow the following

hierarchy of alternatives: the procurement (including modification) of commercially available domestic or international technologies, systems or equipment, or the additional production (including modification) of previously-developed U.S. military systems or equipment, or Allied systems or equipment; cooperative development program with one or more Allies; new joint Component or Government Agency development program; and new Component-unique development program.

11–43. System development and demonstration phase

a. The purpose of the system development and demonstration phase is to develop a system, reduce integration and manufacturing risk; ensure operational supportability with particular attention to reducing the logistics footprint and providing for human systems integration; design for producibility; ensure affordability; the protection of Critical Program Information (CPI); and demonstrate system integration, interoperability, and utility. Discovery and development are aided by the use of simulation-based acquisition and test and evaluation and guided by a system AS and TEMP. System modeling, simulation, test, and evaluation activities are integrated into an efficient continuum planned and executed by a T&E working-level integrated product team (TEWIPT). This continuum features coordinated test events, access to all test data by all involved agencies, and independent evaluation of test results by involved agencies. Modeling, simulation, and DT are under the direct responsibility of the PM or a designated test agency. All results of early operational assessments are reported by the ATEC to the MDA in support of decisions. The independent planning, execution, and evaluation of dedicated initial operational test (IOT), as required by law, and follow-on operational test (FOT) (see para 11–54), if required, are the responsibility of ATEC.

b. This phase can be entered either directly out of technology demonstration and user need activities or from concept exploration. The actual entry point depends on the maturity of the technologies, validated requirements (including urgency of need), and affordability. The MDA determines the appropriate entrance point. There is only one milestone B per program, or evolutionary increment. Each increment of an evolutionary acquisition shall have its own milestone B.

11–44. Entrance criteria for system development and demonstration

a. Entrance into system development and demonstration is dependent on three things: technology (including software) maturity, validated requirements, and funding. Unless some other factor is overriding in its impact, the maturity of the technology determines the path to be followed. Programs that enter the process at milestone B have an integrated architecture and an operational architecture for their relevant mission area.

b. Technology is developed in S&T or procured from industry. Technology must have been demonstrated in a relevant environment or, preferably, in an operational environment (using the transition mechanisms) to be considered mature enough to use for product development in systems integration. If technology is not mature, alternative technology is used that is mature and that can meet the user's needs. The determination of technology maturity is made by the Army S&T executive (DASA(R&T)), and the DUSD(S&T) for MDAPs.

c. Prior to entering system development and demonstration, users shall identify and the requirements authority shall validate a minimum set of KPPs, included in the CDD, that shall guide the efforts of this phase. If a mature technology, non-developmental item, or commercial item is being considered for transition to an acquisition program at milestone B or C, it must have an approved requirements document prior to being approved as an acquisition program.

d. The affordability determination is made in the process of addressing cost as a military requirement in the requirements generation process and included in each CDD, beginning with the acquisition cost but using life-cycle cost or total ownership cost where available and approved. Transition into system development and demonstration also requires full funding (e.g., inclusion of the dollars and manpower needed for all current and future efforts to carry out the AS in budget and out-year programs), which is programmed when a system concept and design have been selected, a PM has been assigned, requirements have been approved, and system-level development is ready to begin. In the case of a replacement system, when the milestone B is projected to occur in the first 2 years of the FYDP under review, the program shall be fully funded in that PPBES cycle. In no case shall full funding be done later than milestone B, unless a program first enters the acquisition process at milestone C.

11–45. Milestone B

Milestone B is normally the initiation of an acquisition program. The purpose of milestone B is to authorize entry into system development and demonstration.

a. Milestone approval considerations. Prior to approving entry into system development and demonstration at milestone B, the MDA considers the validated CDD, system threat assessment, independent technology assessment and any technology issues identified, any early operational assessments or T&E results, AoA, the CCA, manpower estimate (if applicable), system affordability and funding, the program protection for Critical Program Information (CPI), anti-tamper provisions, the Delegation of Disclosure Authority Letter (DDL) concerning foreign disclosure of program information, the proposed AS, cooperative opportunities, and infrastructure and operational support. At milestone B the MDA approves the AS prior to release of the final RFP and approve the development APB, LRIP quantities (where applicable), and system development and demonstration exit criteria (and exit criteria for critical design review, if necessary).

b. For MDAPs, the DOT&E and the cognizant OIPT leader approves the TEMP (including the LFT strategy, if applicable) for all OSD T&E oversight programs. If full-up, system-level LFT is unreasonably expensive and impractical, a waiver can be approved by the DAE, for programs where he or she is the MDA, or by the AAE, for programs where he or she is the MDA, and an alternative live fire test and evaluation (LFT&E) plan shall be approved by the DOT&E before entry into system development and demonstration phase.

c. The AS shall define how the program is structured to achieve full capability. There are two such approaches, evolutionary and single step to full capability. An evolutionary approach is preferred. This approach fields an operationally useful and supportable capability in as short a time as possible with the explicit intent of delivering improved or updated increment capability in the future. The CDD can either include a firm definition of full capability, as well as a firm definition of requirements to be satisfied and IOC date for each increment, or it can include a firm definition of the first increment, but not allocate to specific subsequent increments the remaining requirements that must be met to achieve full capability. In a single step to full capability approach, the full system capability is developed and demonstrated prior to Milestone C.

11-46. Entry into system development and demonstration (SDD)

a. Milestone B approval can lead to system integration or system demonstration. Regardless of the approach recommended, PMs and other acquisition managers continually assess program risks. Risks must be well understood, and risk management approaches developed, before decision authorities can authorize a program to proceed into the next phase of the acquisition process. Risk management is an organized method of identifying and measuring risk and developing, selecting, and managing options for handling these risks. The types of risk include, but are not limited to, schedule, cost, technical feasibility, risk of technical obsolescence, software management, dependencies between a new program and other programs, and risk of creating a monopoly for future procurements.

b. The nature of software-intensive system development, characterized by a spiral build-test-fix-test-deploy process, may lend itself to a combined system integration and system demonstration, rather than serial efforts more typical of hardware-intensive systems.

11-47. System integration work effort

The program enters system integration when the PM has architecture for the system, but has not yet integrated the subsystems into a complete system. This effort is intended to integrate the subsystems and reduce system-level risk. The work effort is guided by validated KPPs. The Critical Design Review during system development and demonstration provides an opportunity for mid-phase assessment of design maturity as evidenced by such measures as, for example, the number of completed subsystem and system design reviews; the percentage of drawings completed; adequate development testing; a completed failure modes and effects analysis; the identification of key system characteristics and critical manufacturing processes; and the availability of reliability targets and a growth plan, etc. Successful completion of Critical Design Review ends system integration and continues system development and demonstration into the system demonstration work effort.

11-48. System demonstration work effort

The program enters system demonstration when the PM has demonstrated the system in prototype articles. This effort is intended to demonstrate the ability of the system to operate in a useful way consistent with the approved CDD. This system demonstration work effort ends when a system is demonstrated in its intended environment, using engineering development models or integrated commercial items; meets validated requirements; industrial capabilities are reasonably available; and the system meets or exceeds exit criteria and milestone C entrance requirements. Preference is given to the use of M&S as the primary method for assessing product maturity where proven capabilities exist, with the use of test to validate M&S results. The completion of the system development and demonstration phase is dependent on a decision by the MDA to commit to the program at milestone C or a decision to end this effort.

11-49. Production and deployment phase

The purpose of the production and deployment phase is to achieve an operational capability that satisfies mission needs. The production requirement of this phase does not apply to MAISs. However, software has to prove its maturity level prior to deploying to the operational environment. A system must be demonstrated before commitment to production (or procurement) and deployment. For DOT&E oversight programs, a system can not be produced at full-rate until a beyond low-rate initial production report has been completed and sent to Congress. The MDA makes the commitment decision at milestone C. Milestone C can be reached directly from pre-systems acquisition (e.g., a commercial product) or from system development and demonstration phase.

11-50. Entrance criteria for production and deployment

Regardless of the entry point, approval at milestone C is dependent on the following criteria being met (or a decision by the MDA to proceed):

a. Acceptable performance in development, test and evaluation, and operational assessment; mature software capability; and no significant manufacturing risks.

How the Army Runs

- b.* An approved capability production document (CPD).
- c.* Acceptable interoperability.
- d.* Acceptable operational supportability.
- e.* Demonstration that the system is affordable throughout the life cycle, optimally funded, and properly phased for rapid acquisition.
- f.* Compliance with the DOD Strategic Plan.
- g.* Acceptable information assurance to include information assurance detection and recovery.
- h.* Acceptable anti-tamper provisions.

11–51. Milestone C

a. The purpose of this milestone is to authorize entry into low-rate initial production (for MDAPs and major systems), into production or procurement (for major and non-major systems that do not require low-rate production) or into limited deployment for MAIS or software-intensive systems with no production components.

b. Milestone approval considerations.

(1) Prior to making the milestone decision, the MDA considers the CCA, and, for MAISs, the CCA and EA, the manpower estimate, compliance with the CCA, STA, the program protection for Critical Program Information including anti-tamper recommendations, the DDL, and an established completion schedule for NEPA compliance covering testing, training, basing, and operational support.

(2) At this milestone, the MDA approves an updated AS prior to the release of the final RFP and approves an updated development APB, exit criteria for LRIP (if needed) or limited deployment, and the ADM.

(3) The DOT&E and cognizant OIPT Leader approve the TEMP for all OSD T&E oversight programs. IT acquisition programs (regardless of ACAT) that entered system acquisition at milestone C are registered with the DOD CIO before milestone C approval.

(4) A favorable milestone C decision authorizes the PM to commence LRIP or limited deployment for MDAPs and major systems. The PM is only authorized to commence full-rate production with further approval of the MDA.

11–52. Low-rate initial production (LRIP) work effort

a. This work effort is intended to result in completion of manufacturing development in order to ensure adequate and efficient manufacturing capability and to produce the minimum quantity necessary to provide production configured or representative articles for IOT, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational (and live-fire, where applicable) testing.

b. Deficiencies encountered in testing prior to milestone C are resolved prior to proceeding beyond LRIP (at the full-rate production (FRP) decision review) and any fixes verified in IOT. Outline test plans (OTPs) are provided to the DOT&E for oversight programs in advance of the start of operational testing.

c. LRIP may be funded by RDTE appropriation or by procurement appropriations, depending on the intended usage of the LRIP assets.

d. LRIP quantities are minimized. The MDA determines the LRIP quantity for MDAPs and major systems at milestone B, and provides rationale for quantities exceeding 10 percent of the total production quantity documented in the AS. Any increase in quantity after the initial determination is approved by the MDA. When approved LRIP quantities are expected to be exceeded because the program has not yet demonstrated readiness to proceed to full-rate production, the MDA assesses the cost and benefits of a break in production versus continuing annual buys.

e. The DOT&E determines the number of LRIP articles required for LFT and IOT of DOT&E oversight programs. For a system that is not a DOT&E oversight program, ATEC determines the number of LRIP articles required for IOT. LRIP is not applicable to AISs or software intensive systems with no developmental hardware. However, a limited deployment phase may be applicable.

11–53. Full-rate production (FRP) decision review

The MDA approves the AS prior to the release of the final RFP, the production APB, and the ADM. Before making the full-rate production and deployment decision, the MDA considers:

- The CCA, and for MAISs, the CCA and EA.
- The manpower estimate (if applicable).
- The results of operational and live fire test (if applicable).
- CCA compliance certification and certification for MAISs .
- C4I supportability certification.
- Interoperability certification.

11–54. Full-rate production and deployment work effort

Following IOT, the submission of the Beyond LRIP and LFT&E Reports (where applicable) to Congress, the SECDEF,

and the USD(AT&L), and the completion of a full-rate production decision review by the MDA, the program enters full-rate production (or procurement) and deployment.

11–55. Sustainment activity/operations and support phase

The objectives of this activity are the execution of a support program that meets operational support performance requirements, and cost effective system sustainment for the life cycle of the system. When the system has reached the end of its useful life, it must be disposed of in an appropriate manner

11–56. Sustain systems work effort

a. The sustainment program includes all elements necessary to maintain the readiness and operational capability of deployed systems. The scope of support varies among programs but generally includes supply, maintenance, transportation, sustaining engineering, data management, configuration management, manpower, personnel, training, habitability, survivability, safety (including explosives safety), occupational health, protection of Critical Program Information (CPI), anti-tamper provisions, IT (including National Security System (NSS)) supportability and interoperability, and environmental management functions. This activity also includes the execution of operational support plans in peacetime, crises, and wartime. Programs with software components must be capable of responding to emerging requirements that will require software modification or periodic enhancements after a system is deployed. A FOT program that evaluates operational effectiveness, survivability, suitability, supportability, and interoperability, and that identifies deficiencies is conducted, as appropriate.

b. Evolutionary sustainment. Supporting the tenets of evolutionary acquisition, sustainment strategies must evolve and be refined throughout the life cycle, particularly during development of subsequent blocks of an evolutionary strategy, modifications, upgrades, and reprocurement. The PM develops and executes a flexible, performance-oriented strategy to sustain their systems. This strategy includes consideration of the full scope of operational support, such as maintenance, supply, transportation, sustaining engineering, spectrum supportability, configuration and data management, manpower, training, environmental, health, safety, disposal and security factors. The use of performance requirements or conversion to performance requirements are emphasized during reprocurement of systems, subsystems, components, spares, and services after the initial production contract.

11–57. Dispose of systems work effort

At the end of its useful life, a system must be demilitarized and disposed of. The PM must address demilitarization and disposal requirements in the AS and ensure that sufficient information exists so disposal can be carried out in accordance with all legal and regulatory requirements relating to safety (including explosives safety), security, and the environment. The DRMO executes the PM's strategy and demilitarizes and disposes of items assigned to the office.

11–58. Total package fielding (TPF) process

a. TPF is currently the Army's standard fielding process. In 1984 the Army began using TPF on a test basis and made it the standard fielding process in 1987. It is designed to ensure thorough planning and coordination between CBTDEVs/TNGDEVs, MATDEVs/fielding commands, and the gaining MACOMs and using units involved in the fielding of new materiel systems. At the same time, it is designed to ease the using and supporting unit logistics burden. Regulatory and instructional guidance for materiel release, fielding, and transfer are contained in *AR 700–142*, and *DA Pamphlet 700–142* respectively. TPF Process is shown in figure 11–9.

INTENT: Reduce Logistics Burdens on the Gaining MACOMs and Their Subordinate User / Support Organizations

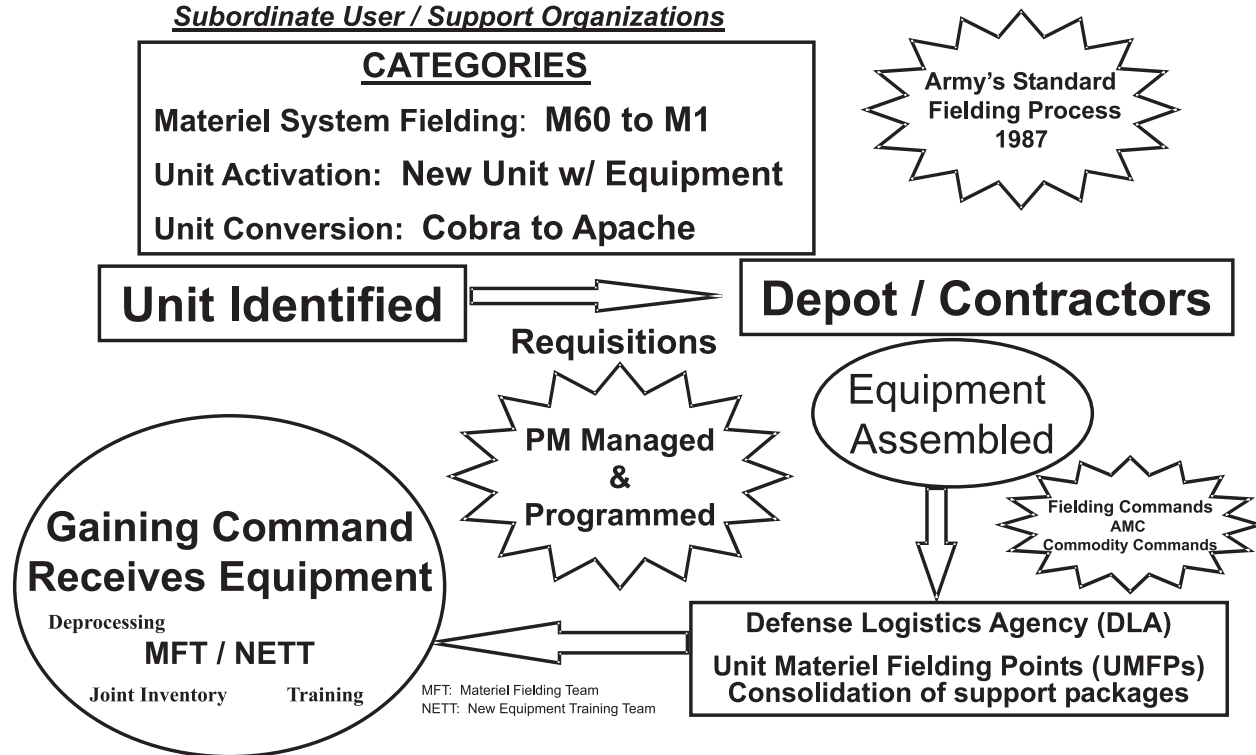


Figure 11–9. Total package fielding concept

b. Identification of the TPF package contents for a particular fielding is known as establishment of the materiel requirements list (MRL). It is the responsibility of the MATDEV/fielding command to identify everything that is needed to use and support the new system and coordinate these requirements with the CBTDEVs/TNGDEVs and the gaining MACOMs. The total fielding requirements are documented, coordinated, and agreed on through the MFP and/or memorandum of notification (MON), the mission support plan (MSP) and the materiel fielding agreement (MFA).

c. The DLA operates unit materiel fielding points (UMFPs) in Pennsylvania, Texas, and California that support the Army. These three DLA UMFPs are sites where initial issue items are consolidated to support TPF worldwide. The staging site is the facility or location where the total package comes together. It is usually here that all end items, support equipment, and packages, if initial issue spare and repair parts, are prepared for handoff to the gaining units. To support TPF outside the Continental United States (OCONUS), the AMC operates a number of central staging sites in Europe, and two sites in Korea.

d. A Joint supportability assessment takes place about 90 days before the projected first unit equipped date (FUED) and 60 days before fielding to a unit in CONUS. The fielding command assures the items requiring deprocessing are inspected and made fully operational-ready before handoff to the gaining units. The fielding and gaining commands conduct a joint inventory to ensure all needed items are received, or placed on a shortage list for later delivery.

e. At the time of handoff, the fielding command provides a tailored customer documentation package for each gaining unit that allows the unit to establish property accountability and post a receipt for TPF materiel. The transactions in the package are tailored to the specific supply system in use at the unit.

11–59. Army system of systems (SoS)/unit set fielding (USF)

a. Introduction.

(1) Background. Army units have often experienced the issuance of 35–90 unsynchronized and non-integrated systems fieldings or software drops for major systems in a single year. This has been very disruptive to the unit's training program and readiness posture and has rarely provided a complete and fully integrated capability to the gaining unit. A disciplined, integrated approach that focuses the fieldings of systems and software into a single window

designated specifically for modernization and training is crucial to reducing the disruptive impacts upon gaining units. This new modernization approach is USF.

(2) USF is the management process for modernizing units by fielding fully integrated unit sets of equipment in support of the ATPC. This process expands on the current single system fielding process -TPF. The concepts are currently scheduled to be applied to the Counter Attack Corps, the Interim units (Stryker BCTs), and the Objective Force.

b. Army SoS management process.

(1) General. Under the current modernization/fielding process, units may receive multiple, separate, and unsynchronized issues of individual systems throughout the year. These TPF fieldings are generally sequenced according to the DA master priority list (DAMPL) and Army order of precedence (AOP) memoranda. Each fielding has an impact upon the unit's readiness. With these multiple fieldings in a year, units have a difficult time maintaining unit readiness and achieving optimum effectiveness of the newly issued systems. Additionally, equipment is often fielded without the appropriate corresponding training modernization and training and installation/infrastructure items. As the Army moves forward with modernization and transformation efforts, the environment is shifting from a focus on fielding "stand alone" systems to fielding "systems-of-systems" to maximize each unit's capabilities. The Army is developing a schedule for modernization, which forces synchronization of: requirements generation, materiel development, manpower and personnel considerations, funding, testing, training, fielding, and sustainment.

(2) The key to managing unit-configured sets of equipment is ensuring that all the available components for a required operational capability are properly integrated as a unit set. Subsequently, the hardware and particularly the software require updating and hardware or software errors must be corrected. An Army configuration management process is required to synchronize, test, integrate, and certify hardware and software unit sets.

(3) The Army SoS management process synchronizes planning and execution activities required to field interrelated and interdependent systems, including training devices. It provides a basis for POM input focused on enhancing unit warfighting capabilities. Synchronizing these activities better enables HQDA to develop an effective force and defend the POM and budget.

c. USF Process. General. For a unit to realize the full capability of new weapons, sensors, digital command and control systems, and training devices, equipment must be integrated, issued, and upgraded as a unit set. The Army requires a plan that packages these required items and identifies windows for fielding new capabilities by unit sets.

(1) Individual components or systems may provide significant standalone improvements in capability, but they do not achieve their full potential until they are integrated with the other systems comprising the unit-configured set. System integration plays a key role in prioritization of program adjustments at both the technical and programmatic levels. The SoS management process provides a disciplined approach that identifies and synchronizes system fieldings and maximizes unit operational readiness. The disciplined approach to achieve this goal is USF.

(2) The key to USF is ensuring that all the components and associated support items of equipment (ASIOE) for a required capability are present and integrated during the fielding process. Unit sets of hardware and software are identified and interoperability certified to establish a configuration baseline prior to fielding. That baseline must be maintained after fielding.

(3) USF serves as the synchronizing process to ensure system fieldings are implemented in an integrated and complimentary fashion in supports of a unit's modernization effort, while minimizing disruption to unit readiness. USF applies to all AA and reserve component unit modernization.

d. USF cycle. The USF process is a cycle that begins five to seven years prior to the beginning of the unit's USF window and ends approximately two years after the window closes. A USF cycle consists of five steps: preparation, reorganization, equipping, training, and validation. The cycle may restart two years after step four is completed.

(1) Step 1 (Preparation): This step covers actions from about five to seven years (lead-time for MCA appropriation (MCA projects)) to six months before a unit enters its USF window. The Army modernization fielding plan (AMFP) defines the USF windows and drives POM development. MATDEVs estimate resource and transportation requirements in support of the AMFP to assist HQDA with the POM build process. MATDEVs also conduct surveys of installation facilities, ranges, motor pools, warehouses, training infrastructure, information infrastructure requirements, etc. These requirements are then submitted to ODCS, G-3 and MACOMs for inclusion in the POM build. Unit force modernization staffing is increased to support USF planning and execution. MACOMs and units receive the critical mission equipment list and schedule the USF windows on their long range training calendars. Other key actions include: identification of the unit to be modernized (HQDA UIC); operational ;and systems architecture finalization; support strategy development; POM adjustments; development of the systems list comprising the unit set; development of training and sustaining documentation; integration testing to validate the unit's hardware/software configuration baseline; and identification of all changes for manning the units as well as any special personnel requirements for soldiers and leaders. During this phase the MATDEV prepares to execute the USF mission. The MACOM and unit will receive a detailed materiel fielding schedule (MFS) two years out. Notification memoranda are provided to the gaining MACOM and unit three years prior to fielding. The timing of this notification will coincide with development of MACOM POM submissions. HQDA will generate disposition instructions eighteen months out for the excess/displaced equipment which triggers disposal planning and resourcing for the equipment. New materiel introductory briefings

(NMIB) and reorganization planning will begin one year out. Six months prior to a unit entering a window, the system-of-system manager (SOSM) will chair a review of the status all preparations to determine whether or not to proceed with the USF.

(2) Step 2 (Reorganization): Unit reorganization begins about six months prior to the USF window and concludes at E-date. This reorganization includes actions and activities required to transition from the unit's current MTOE to a new MTOE, which reflects the new equipment in the unit. Facilities are completed, training devices, training support infrastructure, and TTP are in place, personnel are assigned, and equipment turn-ins are completed.

(3) Step 3 (Fielding): Systems in the unit set will be fielded during this step. The PM for each system will conduct NET. NET completion for all systems in the unit set closes the window and the unit will be taken off C5 status.

(4) Step 4 (Training): The unit is responsible for conducting collective and sustainment training. This training will start after completion of NET and will normally be completed within 18 months after the unit's E-date.

(5) Step 5 (Validation): The MACOM is responsible for validating the operational readiness of the unit to execute its assigned mission. Validation will be the final activity conducted during the training step. MACOM validation completes the USF cycle.

11-60. Software blocking (SWB)

a. SWB is a disciplined process through which the Army achieves and sustains an integrated systems-of-systems (SoS) warfighting capability. SWB is a critical enabler of USF. Software blocking as an acquisition process improvement is consistent with the current *DODD 5000.1* and *DODI 5000.2*. The framework embodied in the SWB policy harmonizes and synchronizes system software developments and upgrades. It is designed to focus the acquisition process on a disciplined approach for achieving interoperability, commonality, and synergistic functionality. In conjunction with USF, SWB is a conduit for executing Army transformation.

b. Under SWB, the Army is making a commitment to divest itself of its traditional systems-centric approach to embrace a SoS capability that supports each element of DOTMLPF. This allows the Army to make smart decisions based on the impact to warfighting capability vice systems. Under the policy, systems include new/upgraded core battlefield systems, trainers, stimulators, test & instrumentation, and simulators needed to achieve an integrated capability across all elements of DOTMLPF. Software blocking applies to all Army systems except those business systems that do not exchange information with tactical C4ISR systems and weapons systems. SWB represents a necessary evolution along the path of acquisition reform. SWB lowers the artificial barrier between elements within the acquisition process that inhibit the Army's ability to develop, test, train, and sustain a synergistic warfighting capability. Through SWB the acquisition process focuses on a total warfighting capability rather than individual systems. SWB is an objective force process being implemented to enhance legacy and interim force operational capability. What this means is that it will take a few iterations before SWB is fully matured. Thus, SWB provides the paradigm through which legacy systems will transition from their stovepipe implementations in support of Joint Venture objectives.

11-61. Army recapitalization

The Army continues to invest in the maintenance and upgrade of systems currently in the force to improve unit effectiveness and warfighting capabilities; reduce operation and support (O&S) costs; improve reliability, safety, maintainability; and to extend legacy systems lifecycles.

a. Why recapitalization? Seventy-five percent (75%) of the Army's major combat platforms (e.g. Abrams, Bradley, Patriot, Apache, Blackhawk, and MLRS) exceed their systems half-life (10 years). Without recapitalization, currently fielded equipment will qualify for "antique plates" by 2011. An aggressive recapitalization program reduces near-term operational risk, ensures combat overmatch and extends the service life of existing warfighting systems.

b. The *Recapitalization Policy memorandum*, dated 1 April 2001, established the Army's roles, responsibilities, definitions, and goals for recapitalization in support of the Army transformation strategy. The Army's FY02 initial recapitalization program had 21 weapon systems approved, but not fully funded. In an effort to fully fund the program, the Army leadership reduced the number of recapitalization programs to 17.

c. Recapitalization is the rebuilding and upgrading of existing weapon systems and/or tactical vehicles. The goal is to ensure operational readiness, a near zero-time/zero-mile condition for selected priority systems, extend service life, and stabilize the growth in O&S costs. The measure of success is in managing fleet age at or below one-half its expected service life. When operationally necessary and financially prudent, the Army selectively upgrade systems to maintain combat overmatch capability and a technological advantage. Recapitalization efforts focus on improving the reliability, maintainability, safety, and efficiency of the Army's current systems at a lower cost than procuring new systems. The requirement to recapitalize all Army systems is significant, and the requirement is clearly unaffordable given the current fiscal constraints and planning guidance. Therefore, the Army decided in FY02 to focus its resources on only those systems and units that are absolutely essential to maintaining today's warfighting readiness while taking risk with other systems and other parts of the force. In order to develop an affordable and executable recapitalization program, the Army prioritized 17 of its systems that must be recapitalized to a near zero-time/zero-hour standard. The Army's prioritized recapitalization program, in addition to selecting only 17 systems, also primarily focuses its resources on the Counterattack Corps (III Corps), taking risk in the Army's remaining units.

d. The FY03 budget has reduced the Army's recapitalization requirements by over \$2.4 billion from FY02 and increased its funding by approximately \$3.7 billion for those 17 systems that belong to specific units. As a direct result, 100% of the Army's prioritized recapitalization program is funded compared to 70% in FY02 for those same systems. This program, which includes the Army's major combat systems (the AH-64 Apache, the UH-60 Blackhawk, the CH-47 Chinook, the M1 Abrams, the Patriot air defense system, and the M2 Bradley) is fully funded. While the recapitalization program approval process has helped the Army focus its resources, reduce requirements, and develop cost effective, funded programs, the Army remains aware of the inherent risk in this program. Even for these 17 systems, the Army has significant unfunded requirements for systems not residing in the Counterattack Corps. The majority of the remaining systems will exceed an average half-life by FY10 and a large proportion of those systems will not be upgraded or rebuilt. As a result of its recapitalization strategy, the Army has provided critical combat capability to the Counterattack Corps, accepted risk in its remaining units, and established a process that will help free up resources for the interim and objective forces. The Army continues to review the scope of its recapitalization efforts each quarter and makes adjustments as appropriate.

11-62. Additional considerations

The above discussion examined the activities performed in each phase of the nominal life-cycle of an acquisition system according to the current *DODD 5000.1*, *DODI 5000.2*, and *AR 70-1*. This is not to imply that all system developments must follow this exact sequencing of life-cycle phases and activities. On the contrary, *DODI 5000.2* specifically authorizes and encourages a PEO/PM to devise program structures and acquisition strategies to fit the particulars of a program; an approach called "tailoring." Other aspects of acquisition planning and strategy; for example, involving P3I and technology insertion can also be accommodated under the broad guidance and direction contained in *DODD 5000.1* and *DODI 5000.2*. What remains constant is the task to develop and deliver combat-capable, cost-effective, and supportable systems to our Army.

Section IX

Acquisition documentation

Acquisition management documentation is designed to support the management process as the life-cycle development of a materiel system progresses.

11-63. Materiel requirements documents (MRDs)

MRDs establish the need for a materiel acquisition program, how the materiel will be employed, and what the materiel must be capable of doing. As the acquisition program progresses, statements of required performance and design specifications become more and more specific. The mission area initial capabilities document (ICD) is the document that initiates the acquisition system management process. MRDs were discussed in detail in section V.

11-64. Other service requirements

The CBTDEV/TNGDEV reviews other Service warfighting capability requirements documents for potential Army interest. When the Army chooses to participate in the RDA of another Service program, HQDA initiates action to validate and approve the documentation. When another Service requirement document, to include an approved production RFP, adequately describes an Army requirement, the document may be approved as the Army requirement. The Army may also acquire other Service equipment with a national stock number (NSN) that has been identified through the MATDEV market investigation and meets an approved Army need. For Joint programs, requirements documents are prepared and processed in accordance with the lead services procedures. Service peculiar requirements may be documented in the other Service's requirements documents.

11-65. Catalog of approved requirements documents (CARDS)

CARDS is an unclassified ODCS, G-3 publication that provides information on the status of approved requirements documents. It includes both active and inactive documents. An active document or assignment of a CARDS reference number does not automatically authorize the expenditure of funds. Each program must compete for funds in the Army prioritization and programming process. ODCS, G-3 (DAMO-RQ) assigns a CARDS reference number to each requirements document after approval and prior to publication and distribution.

11-66. Program review documentation and program plans

The MDA is responsible for identifying the minimum amount of documentation necessary for milestone review purposes. Only those mandatory formats called for by statute or *DODI 5000.2* are required. All other formats are used as guidance only. Program plans are a description of the detailed activities necessary for executing the AS. Program plans belong to the PM and are used by the PM to manage program execution throughout the life-cycle of the program. The PM, in coordination with the PEO, determines the type and number of program plans, except those required by statute or DOD policy. Some of the typical program plans used to support the execution of a program are:

a. *System threat assessment report (STAR)*. The STAR is the basic authoritative threat assessment that supports the development and acquisition of a particular ACAT I or II system. The STAR contains an integrated assessment of

projected enemy capabilities (doctrine, tactics, hardware, organization and forces) at IOC and IOC plus 10 years, to limit, neutralize or destroy the system. It explicitly identifies critical intelligence categories (CICs) which are a series of threat capabilities that could critically impact the effectiveness and survivability of the program. The STAR is a dynamic document that is continually updated and refined as a program develops. It is approved and validated in support of ASARC/DAB/ITAB reviews. This report is the primary threat reference for the CDD, the modified integrated program summary (MIPS), the AoA, and the TEMP developed in support of a MDR. The STAR is approved by ODCS, G-2 and validated by the DIA for all ACAT I and II programs at MS B and updated at MS C. The STAR is called the system threat assessment and approved by HQ, TRADOC (ODCSINT) for ACAT III programs.

b. Modified integrated program summary (MIPS). The MIPS, with its annexes, is the primary Army decision document used to facilitate top-level acquisition milestone decision making. It provides a comprehensive summary of program structure, status, assessment, plans, and recommendations by the PM and the PEO. The primary functions of the MIPS include a summary of where the program is versus where it should be; a description of where the program is going and how it will get there; an identification of program risk areas and plans for closing risks; and a basis for establishing explicit program cost, schedule, and performance objectives. It also includes thresholds in the stand-alone APB and program-specific exit criteria for the next acquisition phase. The MIPS provides answers to the following five key MDR core issues:

- (1) Is the system still needed?
- (2) Does the system work (from the viewpoints of the user, functional staffs, and the PM)?
- (3) Are major risks identified and manageable?
- (4) Is the program affordable (is adequate programming in the POM)?
- (5) Has the system been subjected to CAIV analysis?

c. Acquisition strategy (AS). The AS is the framework (roadmap) for planning, directing, and managing a materiel acquisition program. It states the concepts and objectives that direct and control overall program execution from program initiation through post-production support. An AS is required for all Army acquisition programs. The AS documents how the acquisition program will be tailored and identifies risks and plans to reduce or eliminate risks. The AS, prepared by the PM-led IPT, is a living document that matures throughout the program. It provides fundamental guidance to the functional elements of the MATDEV/CBTDEV organizations. Individual functional strategies leading to the preparation of detailed program plans are required to implement the AS as depicted in figure 11-10.

d. Environmental analysis. This is a Congressionally mandated analysis of the potential environmental impacts of weapons systems. It identifies land, sea or air space requirements of the most promising alternatives and describes the potential effects on the land, sea, and air environment. It also describes the potential impacts on public health and safety by the development, test manufacturing, basing operation, and support of the proposed system. The environmental impact data is weighed against system cost, schedule, and performance in deciding how to best minimize environmental harm.

e. Project office life-cycle cost estimate (POE) and CCA. These documents are prepared in support of MS B and all subsequent MS reviews. The cost estimates are explicitly based on the program objectives, operational requirements, and contract specifications for the system, including plans for such matters as peacetime utilization rates and the maintenance concept. The estimates identify all elements of additional cost incurred with a decision to proceed with development, production, and operation of the system. The estimates are based on a careful assessment of risks and reflect a realistic appraisal of the level of cost most likely to be realized. Two cost estimates are prepared. The CBTDEV-led ICT in support of MS B, and the program office in support of MS C and all subsequent decision reviews prepare the POE. The second, known as the CCA, is prepared by an organization that does not report through the acquisition chain. In the Army, this independent cost analysis is prepared by the Army Cost and Economic Analysis Center (CEAC) for MDAP systems.

f. Army cost position (ACP). The ACP is the Army's approved life-cycle cost estimate for the materiel system. It is used for DOD milestone reviews and is the basis for Army planning, programming and budgeting. For all MDAP programs, the Cost Review Board (CRB) develops the proposed ACP after an intensive review of both the POE and CCA. This proposal becomes the ACP when it is approved by the ASA(FM&C) and then is provided to the AAE. DODI 5000.2 requires the component's cost position.

g. Analysis of alternatives.

(1) The independent AoA provides information to the decision authority at the MS B review to assist in determining whether any of proposed alternatives to an existing system offer sufficient military and/or economic benefit. AoA findings provide the analytical underpinning to support the recommendation to initiate, modify, or terminate a program. An AoA is required for potential ACAT I and most ACAT II programs and is typically conducted by TRADOC Analysis Center (TRAC).

(2) The AoA focuses on broad operational capabilities, potential technology concepts, and materiel solutions that could satisfy the MRD. It examines the full range of materiel alternatives (including those identified in the MS A ADM). AoAs illuminate the relative advantages and disadvantages of alternatives being considered by identifying sensitivities of each alternative to possible changes in key assumptions (e.g., threat) or variables (e.g., selected performance capabilities). The AoA provides insights regarding KPPs for preferred alternatives and indicates how these

parameters contribute to increases in operational capability. It identifies opportunities for trade-offs among performance, cost, and schedule; and determines operational effectiveness and costs (including estimates of training and logistics impacts) for all alternatives.

(3) If a new program is approved, the AoA may be useful for identifying alternatives that will be refined by cost performance trade-off studies during phase B. It should be useful for limiting the number of alternatives to be considered during phase B. The MDA may direct updates to the AoA for subsequent decision points, if conditions warrant (e.g., AoA may be useful for examining cost-performance trade-offs at MS C).

h. Acquisition program baseline (APB). APBs consist of the concept baseline, the development baseline, and the production baseline approved at MS B, C, and FRP, respectively. The purpose of the baselines is to enhance program stability and to provide a critical reference point for measuring and reporting the status of program implementation. Each baseline contains objectives for key cost, schedule, and performance parameters. Key parameters must meet minimum acceptable requirements, known as thresholds, at each milestone decision point. The thresholds establish deviation limits from which a PM may not trade-off cost or performance without authorization from the MDA. The APB must cross-walk to the program CDD or CPD for performance parameters. Failure to meet the threshold requires a reevaluation of alternative concepts or design approaches. APBs and deviation reporting are required for all acquisition categories.

i. Test and evaluation master plan (TEMP). The TEMP is the executive level planning document required for a system that focuses on the overall structure, major elements, and objectives of the T&E program. The TEMP is consistent with the AS as well as the approved CDD/CPD and C4I Support Plan (C4ISP) and is a reference document used by the T&E community to generate detailed T&E plans and to ascertain schedule and resource requirements associated with a given system. It provides a road map for integrated simulation, test, and evaluation plans, schedules, and resource requirements necessary to accomplish the T&E program. The TEMP describes what testing (e.g., DT and OT) is required, who will perform the testing, what resources will be needed, and the evaluation requirements. It relates program schedule, test management strategy and structure, and required resources to critical operational issues; critical technical parameters; measures of effectiveness and suitability; and milestone decisions points. While the MATDEV has the overall responsibility, each T&E WIPT member contributes to the TEMP development and maintenance. The TEMP is initially developed at a system's first milestone review and is updated before each MS or program decision in process review IPR, when the CDD/CPD/C4ISP has changed significantly, or when the APB has been breached. Upon approval, the TEMP serves as a contract between the CBTDEV, MATDEV and T&E community for executing the system's T&E program. The TEMP provides key management controls for T&E in support of the acquisition process. Detailed TEMP procedures and format are in *DA Pamphlet 73-1, T&E in Support of Systems Acquisition*.

j. Manpower estimate report (MER). This Congressionally directed report documents the total number of personnel (military, civilian, and contractor) that are or will be needed to operate, maintain, support, and train for a ACAT I program upon full operational deployment. The validity of the MER is dependent upon force structure, personnel management, and readiness requirements, as well as on the acquisition decision on the size of the buy.

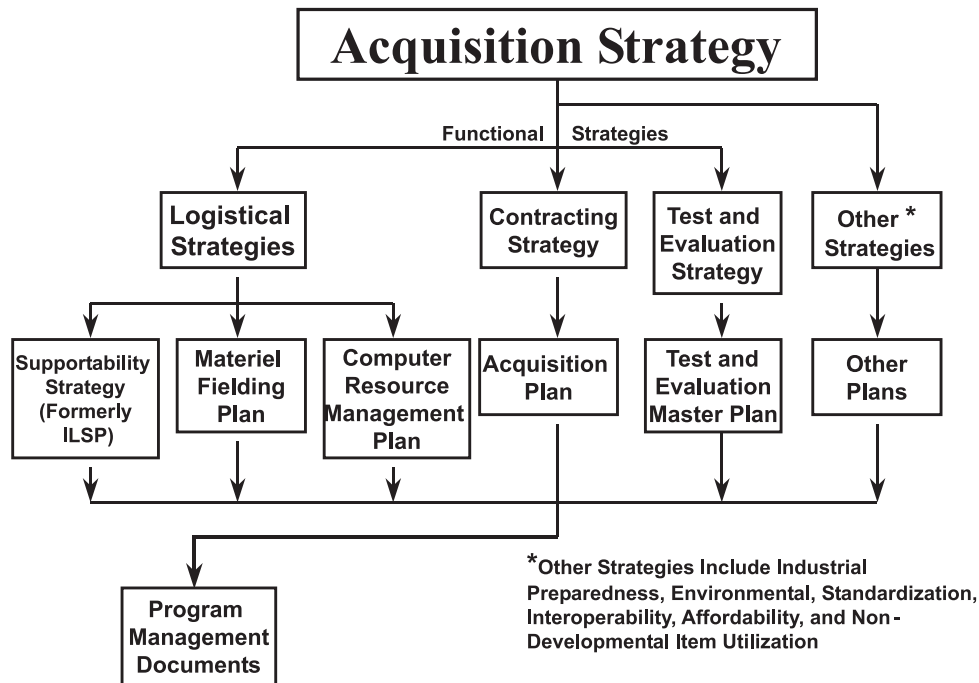


Figure 11-10. Acquisition Strategy

11-67. Typical waivers and reports

a. Live-fire test and evaluation report. Independent OSD report to Congress that provides test results and assessment of realistic survivability testing on a covered major system, and realistic lethality testing on a major munition or missile program. Congress mandates this report.

b. Live-fire test and evaluation waiver. This certifies to Congress when live-fire survivability testing of a covered major system would be unreasonably expensive and impractical. However, some testing must still be accomplished at the subsystem level as described in the alternate LFT&E plan.

c. Developmental test report. This provides the results of DTs to include live-fire test results and reports.

d. System evaluation report (SER). This provides demonstrated system operational effectiveness, suitability, and survivability information at each formal milestone decision. The Army's independent system evaluator - Army Evaluation Center (AEC), produces the report.

e. System assessment. This provides potential system operational effectiveness, suitability, and survivability information at key points before and after each milestone decision. The Army's independent system evaluator - AEC, produces the report.

f. Beyond low-rate initial production report. This provides Congress with an assessment of the adequacy of initial operational testing (IOT) and whether the test results confirm the items are effective, suitable, and survivable for combat prior to the full-rate production (FRP) decision to proceed beyond low-rate initial production. Congress mandates this report.

g. Defense acquisition executive summary (DAES). The DAES is a multi-part document, reporting program information and assessments; PM, PEO, AAE comments; and cost and funding data. The DAES shall be an early-warning report to USD(AT&L) and ASD(C3I). The DAES describes actual program problems, warns of potential program problems, and describes mitigating actions taken. The PM may obtain permission from USD(AT&L) or ASD(C3I), as appropriate, to tailor DAES content. At a minimum, the DAES shall report program assessments (including interoperability), unit costs, and current estimates. It shall report the status of exit criteria and vulnerability assessments.

h. Selected acquisition report (SAR). The SAR reports the status of total program cost, schedule, and performance; as well as program unit cost and unit cost breach information. For joint programs, the SAR reports the information by

participant. Each SAR includes a full, life-cycle cost analysis for the reporting program, each of its evolutionary increments, as available, and for its antecedent program, if applicable. The SAR is provided to Congress.

11–68. Other documentation.

a. Acquisition decision memorandum (ADM). The ADM documents the MDA's decision on the program's AS goals, thresholds, and the exit criteria for the next phase of the program. The ADM is used to document decisions for all ACAT I, II, and III programs.

b. Integrated program assessment (IPA). Information derived from the PM's MIPS allows the DOD OIPT to develop the IPA for program MDR. The IPA summarizes the DOD independent assessment of the PM's program. It identifies critical areas, issues, and recommendations for the MDA. For ACAT ID and IAM programs the IPA is prepared by the OIPT, approved by the OIPT leader, and submitted to the USD(AT&L) or ASD(C3I), as appropriate.

Section X

Acquisition oversight and review (O&R) process

The materiel acquisition process is controlled by decisions made as the result of various acquisition programs MDRs conducted by appropriate management levels at program milestones. The reviews are the mechanism for checking program progress against approved plans and for developing revised APBs. Approval of APBs and plans in these reviews does not constitute program funding approval; allocation of funds in the PPBS process is required.

11–69. Integrated product teams (IPTs)

DODD 5000.1 directs the DOD acquisition community to utilize IPTs to facilitate the management and exchange of program information. IPTs are a management technique that integrates all acquisition activities starting with requirements generation through production, fielding/deployment and operational support in order to optimize the design, manufacturing, business, and supportability processes. The IPT is composed of representatives from all appropriate functional disciplines working together with a team leader to build successful and balanced programs, identify and resolve issues, and make sound and timely recommendations to facilitate decision making. There are three general levels of IPTs: OIPTs focus on strategic guidance, program executability (cost, schedule, risk), and issue resolution; working-level integrated product teams (WIPTs) identify and resolve program issues, determine program status, and seek opportunities for acquisition reform; and integrating level integrated product teams (IIPTs), when necessary, are initiated by the PM to coordinate all WIPT efforts and cover topics not otherwise assigned to another WIPT.

a. Overarching integrated product teams (OIPTs). In support of all ACAT ID and IAM programs, an OIPT is formed to provide assistance, oversight, and review as that program proceeds through its acquisition life-cycle. The OIPT for ACAT ID programs is led by the appropriate OSD principal staff assistant (PSA). The DASD(C3ISR, Space, IT Programs) is the OIPT Leader for ACAT IAM programs. Program OIPTs are composed of the PM, PEO, Component staff, JS, USD(AT&L) staff, and the OSD staff principals or their representatives, involved in oversight and review of a particular ACAT ID or IAM program.

(1) In the Army, an OIPT is established at the direction of the MDA for ACAT IC, IAC, and most II programs. The OIPT is a team of HQDA staff action officers and the PEO/PM/TSM responsible for integration of oversight issues to be raised to the DAB/ASARC/ITAB/IPR review forums.

(2) The secretary/facilitator of the OIPT for Army ACAT I and II programs is the OASA (ALT) DASC for that specific program. OIPT membership consists of empowered individuals appointed by ASARC members (ACAT IC, IAC, or selected II programs), and the MDA for ACAT III programs. Team membership is tailored based on the needs and level of oversight for the individual program. Typical Army OIPT responsibilities include:

(a) Meeting together and individually with the PEO/PM throughout the program development to raise and resolve issues early, providing recommendations for tailoring and streamlining the program.

(b) Linking vertically with the PM's WIPTs.

(c) Helping the PM successfully achieve a milestone decision.

(d) Providing an independent assessment for the MDA in preparation for the MDR.

(e) Developing a memorandum documenting the issues/risks to be raised to the MDA with a recommendation to the MDA.

(3) The OIPT, at all levels, generally follow the procedures described below for a typical ACAT ID and IAM program. Initially the OIPT meets to determine the extent of WIPT support needed for the potential program, to identify members of the WIPTs, to determine the appropriate MS for program initiation, and to determine the minimum information needed for the program initiation review. The OIPT leader is responsible for taking action to resolve issues when requested by any member of the OIPT or when directed by MDA. The goal is to resolve as many issues and concerns at the lowest level possible, and to expeditiously escalate issues that need resolution at a higher level, bringing only the highest level issues to the MDA for decision. The OIPT meets as necessary over the life of a program.

(4) The OIPT leader provides an IPA, previously discussed, at major program reviews or MDRs using data gathered

through the IPT process. The OIPT leader's assessment focuses on core acquisition management issues and takes into account independent assessments that are normally prepared by OIPT members.

b. Working-level integrated product teams (WIPTs). WIPTs are established for all acquisition programs. The number and membership of the WIPTs are tailored to each acquisition phase based on the level of oversight and the program needs. They are comprised of HQDA and/or Service/functional action officers and normally chaired by the PM or designee. WIPTs provide advice to the PM and help prepare program strategies and plans. Each WIPT focuses on a particular topic(s), such as T&E, cost/performance (CAIV), risk management (both programmatic and safety), etc.

c. Integrating level integrated product teams (IIPTs). When necessary, an IIPT, a type of WIPT, is initiated by the PM to coordinate all WIPT efforts and cover all topics not otherwise assigned to another WIPT.

11-70. The Defense Acquisition Board (DAB)

a. The function of the DAB is to review DOD ACAT ID programs to ensure that they are ready for transition from one program phase to the next. The DAB is the DOD senior level forum for advising the USD(AT&L), as the DAE, on critical decisions concerning ACAT ID programs. DAB reviews focus on key principles to include interoperability, time-phased requirements related to an evolutionary approach, and demonstrated technical maturity. The DAB is composed of DOD senior acquisition officials. The board is chaired by the USD(AT&L). The VCJCS serves as the co-chairman. Other principal members include the Under Secretary of Defense (Comptroller); Under Secretary of Defense (Policy); Under Secretary of Defense (Personnel & Readiness); Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)/DOD CIO; Director, Operational Test and Evaluation; and the Secretaries of the Army, Navy, and the Air Force. United States Joint Forces Command is available to comment on interoperability and integration issues that the JROC forwards to the DAB. The DAE may ask other department officials to participate in reviews, as required.

b. Approximately one week prior to the DAB review, the OIPT meets to pre-brief the OIPT leader. The purpose of the meeting is to update the OIPT leader on the latest status of the program and to inform the senior acquisition officials of any outstanding issues and to insure program is ready for a formal DAB review.

c. The JROC reviews all deficiencies that may necessitate development of ACAT I and ACAT IA systems prior to any consideration by the DAB or, as appropriate, ITAB at MS B. The JROC validates an identified mission need, assigns a joint potential designator for meeting the need, and forwards the MRD with JROC recommendations to the USD(AT&L) or ASD(C3I), as appropriate. In addition, the JROC continues its role in validation of KPPs in program baselines prior to scheduled reviews for ACAT I and ACAT IA programs prior to all successive MDRs.

d. The OSD Cost Analysis Improvement Group (CAIG) reviews the component (Army) cost position (ACP), prior to the scheduled MDR and determines if additional analysis is required. The product is an independent cost position assessment and recommendations based on its independent review of the life-cycle cost estimate(s), validation of the methodology used to make the cost estimate(s), and determination if additional analysis or studies is required.

e. A formal DAB review is the last step of the DAB review process. The PM briefs the acquisition program to the DAB and specifically emphasizes technology maturity, risk management, affordability, critical program information, technology protection, and rapid delivery to the user. The PM addresses any interoperability and supportability requirements linked to other systems, and indicates whether those requirements will be satisfied by the AS under review. If the program is part of a system-of-systems architecture, the PM briefs the DAB in that context. If the architecture includes less than ACAT I programs that are key to achieving the expected operational capability, the PM also discusses the status of and dependence on those programs.

f. Following presentations by the PM and a full discussion, the USD(AT&L), as DAE, decides to continue, alter, or terminate the program. This decision is published as an ADM. With the approval of the DAE, other committee reviews may be held for special purposes, such as to develop recommendations for the DAE on decisions other than milestone or program reviews (e.g., release of "withhold funds," baseline changes, AS changes).

11-71. DOD Information Technology Acquisition Board (ITAB)

a. DOD ITAB provide the forum for ACAT IAM milestones, for deciding critical ACAT IAM issues when they cannot be resolved at the OIPT level, and for enabling the execution of the DOD ITAB's acquisition-related responsibilities for IT, including National Security System (NSS), under the Clinger-Cohen Act and Title 10. Wherever possible, these reviews take place in the context of the existing IPT and acquisition milestone review process. Where appropriate, an ADM documents the decision(s) resulting from the review.

b. ITAB focus on key principles such as:

(1) Support of mission needs as described in DPG, Joint Vision, the DOD Information Management Strategic Plan, the operational view of the approved Global Information Grid (GIG) Integrated Architecture, and the approved GIG MRD.

(2) Compliance with GIG-related policies and the approved GIG Integrated Architecture.

(3) Interoperability implementation plans and status implications of program and budget decisions/alternatives.

(4) Compliance with the USD Comptroller's policies on Financial Management Modernization Plan (FMMP).

c. Principal participants at DOD ITAB reviews include the following department officials: the Deputy DOD CIO; IT

OIPT leader; ACAT ID OIPT leaders; cognizant PEO(s) and PM(s); CAEs and CIOs of the Army, Navy, and Air Force. Participants also include (as appropriate to the issue being examined) executive-level representatives from the following organizations: Office of USD(AT&L); Office of the Under Secretary of Defense (Comptroller); Office of the JCS; Office of DOT&E; Office of the Director, PA&E; and Defense Information Systems Agency.

11-72. The Army Systems Acquisitions Review Council (ASARC)

a. The ASARC is the Army's senior-level advisory body for ACAT IC, IAC, and selected II programs, ACAT ID programs (DAB managed) prior to a DAB, and ACAT IAM programs prior to a ITAB. The ASARC convenes at formal milestones to determine a program or system's readiness to enter the next phase of the materiel acquisition cycle, and makes recommendations to the AAE on those programs for which the AAE is the MDA. An ASARC may also be convened at any time to review the status of a program. The ASARC is chaired by the AAE and co-chaired by the VCSA.

b. ASARC membership includes the VCSA, DUSA(OR); ASA(FM&C); CG, TRADOC; OGC; CIO/G-6; DCS, G-3; DCS, G-4; DCS, G-8; MILDEP to the ASA(ALT); CG, ATEC and the Director, U.S. Army Cost and Economic Analysis Center. The following organizations are invited to attend if a significant issue is identified within their area of responsibility: ASA(I&E); ASA(M&RA); CG, AMC; Army IG; DCS G-1; DCS G-2; Chief, Army Reserve; Chief, NGB; Chief, Legislative Liaison; G-8 DPAA; COE; Surgeon General; CG, MTMC; CG, USASMD; Commander, Safety Center; Director, Small and Disadvantaged Utilization Office; and the Chief of Public Affairs (CPA) (see para 22-12). The AAE makes the final decision as to ASARC attendance.

c. The effectiveness of the ASARC review process results from presentation of thorough analysis of all relevant issues and face-to-face discussion among the principals from the ARSEC, ARSTAF, and MACOMs (AMC and TRADOC).

11-73. In-process review (IPR)

a. The IPR is a formal review forum for ACAT III programs. General policies for reviews for IPR programs are the same as for ACAT I and II programs. Reviews are conducted at milestones and at other times deemed necessary by the MDA. The MDA, usually the PEO, chairs the IPR.

b. The IPR brings together representatives of the MATDEV, the CBTDEV, the trainer, the logistician, and the independent evaluators for a joint review and decision on whether to proceed to the next phase of development. The purpose of the IPR is to provide recommendations, with supporting rationale, as a basis for system concept, system development, type classification, and production decisions by the appropriate level of authority. They are the forums where responsible agencies in the materiel acquisition process can present their views and ensure those views are considered during development, test, evaluation, and production. Participation is extended to the appropriate testing agencies, HQDA representatives, and to such others as the IPR chairman designates.

11-74. Other program reviews.

a. Army system review (ASR).

(1) The ASR is the highest-level system review conducted at HQDA prior to the POM/mini-POM build. It allows the SECARMY and CSA to review key acquisition systems supporting Transformation and Joint Vision concepts (e.g., dominant maneuver, precision engagement, information superiority, full dimensional protection, and focused logistics), permitting informed decisions based on priorities and resources. The ASR, conducted bi-monthly (6 hour block session), is a DOTMLPF oriented systems-of-systems review that provides HQDA senior leaders with system programmatic information. It involves them in weapons systems development, and provides them an opportunity to impact a system's life cycle. The PM, and synchronization staff officer (SSO) brief the system from the MATDEV and warfighter perspective. The OASA(ALT) is solely responsible for the materiel section of these reviews. The ARSTAF is present to address any DOTMLPF/resource issues raised.

(2) Following the ASR, an executive session is scheduled with the SECARMY to provide him an executive summary of the ASR and address any questions/concerns he may have. This executive summary starts with the requirement establishing the system, shows the "system-of-systems" approach used in the actual ASR, and walks the SECARMY through the programmatics including funding, schedule, program status, risk, and probability of success. The executive session (2 hour block session) is conducted within 10 working days of the ASR.

(3) Army System rReview membership: CSA (chair); VCSA; ASA (ALT); CG, TRADOC; CG, FORSCOM; CG, AMC; CG, ATEC; OFTF; Army G-1; Army G-2; Army G-3; Army G-4; Army CIO/G6; Army G-8; ASA (ALT) MILDEP; DASA (B); DPAA; ACSIM; CPA; CLL; Army G-8 - D, FD; Army G-8, DOI; Army G-8, DOM; Army G-8, FDH; Army G-3, D, TR; Army G-3, Army G-3, D, FM; Army G-3, TCP; and select PEO, PMs, and SSOs based on programs to be reviewed.

(4) Executive session membership: SECARMY, USA, CSA, ASA (ALT), ASA (FMC), CIO/G-6, PA&E, Army G-8, and Army G-3.

b. *System program review (SPR).* The SPR is the primary HQDA (2 star) review of acquisition systems prior to the POM/Mini-POM build. The SPR is co-chaired by the G-8 Director, Force Development and the ASA(ALT) Deputy for

How the Army Runs

Systems Management. PEOs brief the SPR on selected programs. Specifically they brief, in coordination with TRADOC,:

- (1) System characteristics;
- (2) Compliance with system operational requirements;
- (3) Acquisition strategy (AS);
- (4) Program funding and unfunded requirements; and
- (5) POM issues.

c. PEO portfolio and sustainment reviews.

(1) PEO portfolio reviews are bi-annual, formal in-phase program reviews. This process allows the AAE to review, assess and advise the PEOs on all Army programs at least twice a year, regardless of their size or importance. Such discipline places appropriate emphasis on effective management of all programs throughout their life-cycle. To support the formal review process, the AAE is requiring PMs and PEOs to provide periodic, informal status reports through the chain of command as key events occur in a program's life-cycle.

(2) In cooperation with the CG, AMC the AAE has established a process requiring each PEO and his supporting AMC commodity commands to review program support from the sustainment perspective each quarter. This review will be attended once annually on a regional basis by the AAE, joined by the CG, AMC. This review process provides a focus on sustainability of current and future programs and furthers the partnership with AMC, which retains responsibility for the materiel readiness of fielded systems.

d. System requirements review (SRR). The SRR is the TRADOC cyclic comprehensive review of key materiel programs by the DCSDEV, DCG, and CG, TRADOC. The purpose of the SRR is to establish the program's continued relevance to the future Army; determine status of the TRADOC (proponent) deliverables, identify and initiate resolution of issues prior to review by HQDA, and prepare the TRADOC leadership to defend the need for the system to HQDA, OSD and Congress.

Section I

Testing and evaluation

There are three major subprocesses that support the overall management process of system acquisition.

11-75. T&E strategy

a. All Army acquisition programs must be supported by an integrated T&E strategy that reflects an adequate and efficient T&E program. T&E is the principal tool with which progress in system development and acquisition is measured. T&E is structured to support the defense acquisition process and user by providing essential information to decision-makers, assessing attainment of technical performance parameters, and determining whether systems are operationally effective, suitable, and survivable for intended use. Primary reasons for conducting T&E is to facilitate learning, assess technical maturity and interoperability, facilitate integration into fielded forces, and confirm performance. T&E can also assess and reduce program risk (e.g., schedule, cost, technical feasibility, technical obsolescence, and software management). The primary product of the T&E subprocess is information (hard facts) plus an independent evaluation of all credible data on a system so that the MDA can make informed decisions.

b. The planning, programming, and budgeting for T&E begins early in the acquisition process, concurrent with coordination of the validated initial capabilities document (ICD). Early T&E integration is accomplished through the independent evaluator's involvement in the ICT and the planning of the acquisition team within the T&E WIPT. The primary purpose of the T&E WIPT is to optimize the use of the appropriate T&E expertise, instrumentation, targets, facilities, simulations, and models to implement test integration, thereby reducing costs and decision risk to the Army. The primary product of the T&E WIPT is a TEMP, previously discussed. The DUSA(OR) is the TEMP approval authority for all ACAT I and II programs and any ACAT III programs on the OSD T&E Oversight List.

c. CE is used to provide a continuous flow of information and data to decision-makers, MATDEV, and CBTDEV. The data generated in early development phases is visible and maintained as the system moves into the formal testing, thereby avoiding duplication of testing. CE continues through a system's post-deployment so as to verify whether the fielded system meets or exceeds demonstrated performance and support parameters.

11-76. Developmental testing (DT) and operational testing (OT)

a. DT encompasses models, simulation, and engineering type tests that are used to verify that design risks are minimized, system safety is certified, achievement of system technical performance is substantiated, and to certify readiness for OT. DT generally requires instrumentation and measurements, is accomplished by engineers and technicians, is repeatable, may be environmentally controlled, and covers the complete spectrum of system capabilities. The PM designs DT objectives appropriate to each phase and milestone. Key DTs are the LFT which is mandated for covered systems, and the production qualification test which is the system-level test ensures design integrity over the specified operational and environmental range.

b. OT is a field test of a system (or item) under realistic operational conditions with users who represent those expected to operate and maintain the system (or item) when fielded or deployed. Key OTs are:

(1) *Initial operational test (IOT)*. It is conducted before the full-rate production decision and is structured to provide data to determine the operational effectiveness, suitability, and survivability of a system operated by typical users under realistic conditions (e.g., combat and representative threat). Before an IOT commences for all programs on the OSD T&E Oversight List, OSD (DOT&E) must approve the OT plan.

(2) *Follow-on operational test (FOT)*. FOT may be necessary during (or after) production to refine the estimates made during the IOT, provide data to examine changes, and verify that deficiencies in materiel, training, or concepts have been corrected. A FOT provides data to ensure that the system continues to meet operational needs and that it retains its effectiveness in a new environment or against a new threat.

c. Until FY04, OT and some DT events requiring soldiers are funded through the Army's TSARC process. Beginning in FY04, both DT and OT test costs for all Army ACAT II and III systems must be programmed by the PM. The TSARC is a HQDA GO/SES centralize management forum that meets semi-annually to review and coordinate the resources required to support the tests to be included in the Army's Five-Year Test Program (FYTP). The TSARC is chaired by CG, ATEC and operates under AR 73-1. When approved for inclusion in the FYTP, a program's OTP becomes authority for tasking in the current and budget years. The OTP is a acquisition system's formal T&E resource planning and tasking document.

Section II

Integrated logistics support (ILS)

The second major subprocess in support of acquisition system management is ILS. ILS is a disciplined, unified, and interactive approach to the management and technical activities necessary to integrate logistics support into system and equipment design.

11-77. ILS requirements and procedures

This section outlines requirements and procedures used to plan, program, develop, acquire, test, evaluate/assess, train, and deploy (concurrent with fielding of a new/modified weapon system) all the necessary support resources to ensure the supportability and readiness of the system when fielded. The ILS process ensures identification and development of the support resources required to keep a system and supporting training devices in an operational ready status throughout its operational life in a timely and cost effective manner. When the CBTDEV selects the best support concept during the acquisition process, he establishes and chairs the supportability integrated product team (SIPT), formerly known as the ILS management team (ILSMT), to provide detailed implementation of the support concept and develop the supportability strategy (SS). The MATDEV chairs the SIPT. The SIPT considers numerous alternatives and trade-offs, codified in a Supportability Analysis, which is required to identify the optimum support system requirements. Both the MATDEV and CBTDEV perform SA tasks (either in-house or through contractors) applicable to their respective mission responsibilities as defined in AR 700-127. Life-cycle software engineering centers (LCSECs) serve as members of the SIPT and provide support for the supportability analysis of software dependent systems, regardless of whether the LCSEC will perform software maintenance and support or only have a coordination role.

11-78. ILS process

a. The ILS process pursues three thrusts simultaneously. The first is design influence in order to reduce O&S costs and simplify equipment operation and maintenance. The second concerns the design of support, identification of resources, development and acquisition of the necessary support resources, and fielding of support to assure satisfactory operation and readiness of the system. The third addresses supporting the design throughout the life of the system. The effectiveness of the first thrust reduces demands on the second. In the case of COTS/NDI acquisitions, the ILS thrust is attained by focusing on the source selection process.

b. Logistics support is a programmatic concern being an integral part of system performance including operational and performance characteristics of the system (*DODI 5000.2*). Thus, the effectiveness of an ILS program requires strong management, involvement, a tailored SIPT, and close coordination among SIPT members so that ILS is integrated throughout the materiel acquisition process. The integrated logistics support manager (ILSM) as the chairman of the SIPT works in conjunction with other members of the SIPT and the PM IIPT. ILS strategies and requirements are developed IAW the strategies and requirements of the PM IIPT. Continued coordination and cooperation between the CBTDEV and MATDEV ILS organizational elements and the PM IIPT is essential.

c. In an effort to operate within resource constraints, the CBTDEV and MATDEV ILS communities generate improvements in readiness support and supportability related system design through:

- (1) Jointly developing necessary MANPRINT plans and strategies.
- (2) Jointly developing an early-on ILS program and SS (formerly known as the integrated logistical support plan (ILSP)).
- (3) Use of SA and HSI analytical techniques for the performance of ILS program objectives.
- (4) Development and/or change of doctrine, policy and procedure.
- (5) Investigation of HSI, SA and other analytical techniques for deriving manpower, personnel, training and logistics impacts from the mission needs/solutions and other CBTDEV and MATDEV analyses.
- (6) Identification of —

How the Army Runs

- contract incentives,
- system readiness objectives (SROs),
- modification candidates,
- embedded training capability/options.

(7) Emphasis on commercial, other Service and allies technical advances in supportability characteristics and techniques.

d. The CBTDEV and MATDEV in coordination with the HQDA ODCS, G-4, jointly establish an ILS program. The CBTDEV is principally responsible for identifying and documenting general ILS requirements and constraints through studies and analysis and for developing the SA strategy during the phase A. Generally, lead responsibility for ILS transfers to the MATDEV upon entry into phase B.

Section III

Manpower and personnel integration (MANPRINT) program

The third major subprocess in support of acquisition system management is the MANPRINT program. MANPRINT is the Army's application of the DOD HSI requirements in systems acquisition (*DODD 5000.1 and DODI 5000.2*), in compliance with *Title 10*. MANPRINT, described in detail in *AR 602-2*, is the Army's program to ensure that the soldier and human needs are considered throughout the entire system acquisition process and life-cycle, and that human performance is always considered as part of "total" system performance.

11-79. Seven MANPRINT domains

MANPRINT integrates and facilitates trade-offs among the following domains but does not replace individual domain activities, responsibilities, or reporting channels:

a. Manpower is defined as the personnel strength (military and civilian) available to the Army. Manpower refers to considering the net effect of Army systems on overall HR requirements and authorizations (spaces), to ensure each system is affordable from a manpower standpoint. It includes analysis of the number of people needed to operate, maintain, and support each new system being acquired, including maintenance and supply personnel, and personnel to support and conduct training. It requires a determination of the Army manpower requirements generated by the system, comparing the new manpower needs with those of the old system(s) being replaced. If an increase in personnel is required to support a new (or modified) system, "bill payers" must be identified from existing personnel accounts.

b. Personnel capabilities. Military and civilians possessing the aptitudes and grades required to operate, maintain, and support a system in peacetime and war. Personnel refers to the ability of the Army to provide qualified people in terms of specific aptitudes, experiences, and other human characteristics needed to operate, maintain, and support Army systems. It requires a detailed assessment of the aptitudes that personnel must possess in order to complete training successfully as well as operate, maintain, and support the system to the required standard. Iterative analyses must be accomplished for the system being acquired, comparing projected quantities of qualified personnel with the requirements of the new system, any system(s) being replaced, and overall Army needs for similarly qualified people. Personnel analyses and projections are needed in time to allow orderly recruitment, training, and assignment of personnel in conjunction with system fielding.

c. Training. Considerations of the necessary time and resources required to impact the requisite knowledge, skills, and abilities to qualify Army personnel for operation, maintenance, and support of Army systems. It involves (1) formulating and selecting engineering design alternatives that are supportable from a training perspective (2) documenting training strategies, and (3) determining resource requirements to enable the Army training system to support system fielding. It includes analyses of the tasks that must be performed by the operator, maintainer, and supporter; the conditions under which the tasks must be performed; and the performance standards that must be met. Training is linked with personnel analyses and actions because availability of qualified personnel is a direct function of the training process.

d. Human factors engineering. Human factors engineering is the technical effort to integrate design criteria, psychological principles, and human capabilities as they relate to the design, development, test, and evaluation of systems. The human factors engineering goals are:

(1) To maximize the ability of the soldier to perform at required levels by eliminating design-induced error.

(2) To ensure materiel maintenance, support, and transport are compatible with the capabilities and limitations of the range of fully equipped soldiers who would be using such materiel. Human factors engineering provides an interface between the MANPRINT domains and system engineers. Human factors engineering supports the MANPRINT goal of developing equipment that will permit effective soldier-machine interaction within the allowable, established limits of training time, soldier aptitudes and skill, physical endurance, physiological tolerance limits, and soldier physical standards. Human factors engineering provides this support by determining the soldier's role in the materiel system, and by defining and developing soldier-materiel interface characteristics, workplace layout, and work environment.

e. System safety. The application of engineering and management principles, criteria, and techniques to optimize

safety within the constraints of operational effectiveness, time, and cost throughout all phases of the system or facility life-cycle.

f. Health hazards. The inherent conditions in the use, operation, maintenance, support and disposal of a system (e.g., acoustical energy, biological substances, chemical substances, oxygen deficiency, radiation energy, shock, temperature extremes, trauma, and vibration) that can cause death, injury, illness, disability, or reduce job performance of personnel.

g. Soldier survivability. A soldier within the context of MANPRINT may refer to a military or a civilian.

(1) System. The characteristics of a system that can reduce fratricide, reduce detectability of the soldier, prevent attack if detected, prevent damage if attacked, minimize medical injury if wounded or otherwise injured, and reduce physical and mental fatigue.

(2) Soldier. Those characteristics of soldiers that enable them to withstand (or avoid) adverse military action or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission.

11–80. MANPRINT objectives and concept

a. MANPRINT is intended to influence the design of developmental systems and the selection of NDI systems with the primary objective of achieving maximum total system effectiveness at a reasonable and affordable life-cycle cost of ownership. MANPRINT implementation impacts total system performance (both effectiveness and availability) by making explicit the role soldier performance plays and is shaped by design factors. MANPRINT also addresses the manpower, personnel, and training resources needed to achieve the required performance and, where possible, indicates more affordable configuration of manpower, personnel, and training resources.

b. The engineering design philosophy of MANPRINT is focused on optimum system performance on the battlefield, which includes consideration of both soldier and equipment capabilities and survivability. MANPRINT is an option-oriented process as opposed to an objective-oriented process. The MANPRINT process provides decision makers information upon which to make trade-offs in areas such as quality and numbers of people, training times, technology, conditions, standards, costs, survivability, safety, health hazard risks, design and interface features, and personnel assignment policy.

c. The body of MANPRINT expertise, formerly known as the MANPRINT joint working group, continues to function through the ICT and IPT process. The MANPRINT members of the ICT transition to the MANPRINT WIPT when applicable. The purpose of this body is to:

(1) Assist the CBTDEV (or functional proponent) and PM to ensure MANPRINT principles are applied to the system,

(2) Provide MANPRINT input to the MRDs, and

(3) Provide a tracking system and historical database of MANPRINT issues.

d. The Army Research Laboratory's Human Research & Engineering Directorate (HRED) serves as the MANPRINT focal point for coordinating domain support for ICTs and IPTs. Additional MANPRINT information and references are available online at <http://www.manprint.army.mil>.

Section IV

Acquisition resources management

11–81. Appropriations

The "color of money," or kind of appropriation, is an important factor in acquisition management. In general, a particular appropriation can be expended only for specified activities, and money cannot be changed from one appropriation to another. Acquisition management involves at least two appropriations, and may involve four. The two-year RDTE appropriation provides funds for research, design engineering, prototype production, LRIP for OT, and T&E activities in the course of developing a materiel system. The three-year procurement appropriation provides funds for procuring materiel that has been fully tested and type classified. Procurement funds are also used to procure LRIP systems for initial spares, support and training equipment. The Operations and Maintenance, Army (OMA) appropriation provides funds for retiring and retrograding the old equipment being replaced; for repairing systems after fielding; for fuel and ammunition for training and operations; for periodic system rebuild; for training both system operators and maintainers, except NET; and, in general, anything else to keep a system in the field and operating. Some systems may require MCA APFs for the construction of special facilities required for fielding that system.

11–82. Program and budget process

Funds of the correct amount and appropriation must be planned and programmed into the Army budget, in general, two years before they are needed. In the program and budget process, funding requests are initiated or reviewed annually. Congress appropriates funds for RDTE (Title IV) and Procurement (Title III) as part of the "Defense Appropriation Act." The RDTE and procurement budget requests must first be approved by DOD, submitted to Congress by the President, and then be authorized and appropriated in two separate Congressional actions before any money can be

spent. In the year of budget execution, the Army may reprogram funds, except for Congressional interest items, within an appropriation subject to limits, or with prior Congressional approval. Up to \$4 million of RDTE and \$10 million of procurement may be reprogrammed into a program without prior Congressional approval (see Table 11–2). The PM is responsible for planning and programming RDTE and procurement funds to cover a program, and the MCA, when needed. The PM also is responsible for programming all life-cycle system costs while a system remains under his management control. This includes programming for outyear sustaining resources as well as RDTE and procurement. Once the management responsibility transitions to the managing AMC "commodity command", it then becomes that command's responsibility to continue the depot-level sustaining program. The field user MACOM is responsible to program day-to-day system below-depot operational support. The field user MACOM is responsible for planning and programming the OMA funds needed to ensure continued readiness of the fielded system. Responsibility for planning and programming funds for PIs and sustaining supply spare parts is complex and divided between the MATDEV and the field MACOM.

Table 11–2
Below Threshold Reprogramming Levels

APPN	MAX IN	MAX OUT	Level of Control	OBL AVAIL
RDTE	< \$ 4M	Greater of \$ 4M or 20% of Program Element	¹ Program Element	2 Years + 5 Years (Execution)
PROC	< \$ 10M	Greater of \$ 10M or 20% of Line Item	Line Item	3 Years + 5 Years (Execution)
OMA	< \$ 15M	No Congressional Restriction	Budget Activity	1 Year + 5 Years (Execution)
MILCON	Lessor of +\$ 2M or 25% of Project	Lessor of + \$ 2M or 25% of Project	Project	5 Years + 5 Years (Execution)

11–83. RDTE appropriation activities

To assist in the overall planning, programming, budgeting, and managing of the various R&D activities, the RDTE appropriation is divided into seven R&D budget activities. These categories are used throughout DOD. The current RDTE budget activities are as follows.

a. Budget Activity 1–Basic Research. Basic research efforts provide fundamental knowledge for the solution of identified military problems. It includes all efforts of scientific study and experimentation directed toward increasing knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It provides farsighted, high payoff research, including critical enabling technologies that provide the basis for technological progress. It forms a part of the base for (a) subsequent applied and advanced developments in Defense-related technologies, and (b) new and improved military functional capabilities in areas such as communications, detection, tracking, surveillance, propulsion, mobility, guidance and control, navigation, energy conversion, materials and structures, and personnel support. Basic research efforts precede the system specific research described in the *ASTMP*.

b. Budget Activity 2–Applied Research. This activity translates promising basic research into solutions for broadly defined military needs, short of major development projects, with a view to developing and evaluating technical feasibility. This type of effort may vary from fairly fundamental applied research to sophisticated breadboard hardware, study, programming and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. It should thus include studies, investigation, and non-system specific development effort. The dominant characteristic of this category of effort is that it be pointed toward specific military force operating capabilities (FOCs) with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters. Program control of the applied research element will normally be exercised by general level of effort. Applied research precedes the system specific research described in the *ASTMP*.

c. Budget Activity 3–Advanced Technology Development. This activity includes all efforts, which have moved into the development and integration of hardware and other technology products for field experiments and tests. The results of this type of effort are proof of technological feasibility and assessment of operability and producibility that could lead to the development of hardware for Service use. It also includes ATDs that help expedite technology transition from the laboratory to operational use. Projects in this category have a direct relevance to identified military needs. Advanced technology development may include concept and technology development as described in the *ASTMP*, but is non-system specific.

d. Budget Activity 4–Demonstration and Validation. Includes all efforts associated with advanced technology development used to demonstrate the general military utility or cost reduction potential of technology when applied to different types of military equipment or techniques. It includes evaluation, synthetic environment, prototypes, and proof-of-principle demonstrations in field exercises to evaluate system upgrades or provide new operational capabilities. The demonstrations evaluate integrated technologies in as realistic an operating environment as possible to assess

the performance or cost reduction potential of advanced technology. It may include concept and technical development exploration as well as system development and demonstration, but is system specific.

e. Budget Activity 5—Engineering and Manufacturing Development. Includes those projects in system development and demonstration for Service use. This area is characterized by major line item projects and program control is exercised by review of individual projects. Includes system development and demonstration projects, and may include OT. *DODI 5000.2* changed the acquisition phase names that BA 4 & 5 support from program definition and risk reduction (phase I) and engineering and manufacturing development (phase II) to phase B – system development and demonstration.

f. Budget Activity 6—RDTE Management Support. Includes efforts directed toward support of RDTE installations or operations required for use in general R&D and not allocable to specific R&D missions. Included are technical integration efforts, technical information activities, space programs, major test ranges, test facilities and general test instrumentation, target development, support of OTs, international cooperative R&D, and R&D support.

g. Budget Activity 7—Operational System Development. Includes R&D effort directed toward development, engineering, and test of changes to fielded systems or systems already in procurement which alter the performance envelopes. Operational system development may include OT costs. FY03 R&D support to miscellaneous operational efforts include: Combat Vehicle product improvement program (PIP), MLRS PIP, Horizontal Battlefield Digitization, Satellite Communication Ground Environment, etc. Program control is exercised by review of individual projects.

11–84. Procurement appropriations

The procurement appropriation funds the procurement of materiel systems that have been fully tested and type classified. The Army budget includes five separate procurement appropriations:

a. Aircraft Appropriation. Aircraft procurement includes the procurement of aircraft, aircraft modifications, spares, repair parts, and related support equipment and facilities.

b. Missile Appropriation. Missile procurement includes the procurement of missiles, missiles modifications, spares, repair parts, and related support equipment and facilities.

c. Weapons and Tracked Combat Vehicles (WTCV) Appropriation. WTCV procurement includes tracked and combat vehicles, weapons, other combat vehicles, and repair parts.

d. Ammunition Appropriation. Ammunition procurement includes procurement of ammunition end items, ammunition production base support, and ammunition demilitarization.

e. Other Procurement, Army (OPA) Appropriation. OPA covers three major categories:

- (1) tactical and support vehicles,
- (2) communications and electronic equipment, and
- (3) other support equipment.

11–85. Research, development, and acquisition plan (RDAP)

Introduction. The FY04–18 RDA planning process began with the construction of the FY04–09 RDA POM and continues with the development of the FY04/05 budget estimate submit (BES) and the FY04/05 President's budget. During each of these three stages, the extended planning period (EPP), FY10–18, is revised to ensure a reasonable progression from the period FY04–09.

a. RDA database. The ODCS, G–8 RDA database represents the RDA plan. The principal elements of the RDA database, MDEPs, are grouped by budget operating system (BOS). A BOS is a set of MDEPs that represent a common function on the battlefield or a common activity of the supporting Army infrastructure (e.g., aviation, ammunition). Most BOSs are managed by a G–8 division. The division chief (known as the BOS manager), assisted by his staff and his ASA(ALT) counterpart, determines the requirements for each of the MDEPs within his or her BOS. Requirements are prioritized by ODCS, G–3.

b. Overview. The Army RDA Plan is a 15-year plan for the development and production of technologies and materiel to advance Army modernization. Modernization is "the continuous process of integrating new doctrine, training, organization and equipment to develop and field warfighting capabilities for the total force." Under ideal circumstances Army modernization would be fully supported by an unconstrained RDA program. However, the realities of limited resources restrict modernization to those efforts that are both technically and fiscally achievable. The RDA plan, therefore, is the result of a process that converts the Army's unconstrained planning environment into a constrained RDA program that maximizes warfighting capabilities and supporting infrastructure requirements within limited resources.

c. The RDA plan assumes the form of a 1–N priority list of RDTE/procurement program packages called MDEPs with funding streams for the entire 15-year planning period. An MDEP represents a particular program, function or organization and displays the resources (dollars, system quantities, civilian and military manpower) needed to achieve an intended goal. An MDEP may receive its resources (funding streams) from any number of appropriations. The RDA Plan, however, includes only the RDTE and procurement funding streams of its MDEPs. There is no limitation to the number of commands to which the resources of an MDEP may be assigned. The RDA plan is recorded in and represented by the ODCS, G–8 RDA database.

d. The RDA plan is a continual process comprising periodic revisions to the 15-year planning period of the RDA database. The revisions occur during the three principal stages of the PPBES cycle: the POM, BES and President's budget process. During each of these three stages, the Army adjusts the first six years (called the Future Years Defense Plan (FYDP)) of the 15-year planning period. These six years are also referred to as the POM. After each stage, the Army's RDA community adjusts the final nine years, called the EPP, to ensure a smooth and reasonable progression from the FYDP to EPP. The 15-year planning period of the RDA database moves forward by two years each alternate January to conform to the OSD requirement for a biennial POM and budget. For example, the FY04–18 RDA Plan began in January 2002; the FY06–20 RDA Plan will begin in January 2004.

e. During the second year of the biennial budget cycle, the Army develops a POM update of the preceding year's POM, often referred to as a mini-POM. The update includes years two through six of the planning period. In 2002, the POM covered FY04–09; in FY2003 the POM update will cover FY05–09. Similarly, the FY04–18 RDA Plan of 2002 will undergo an update in 2003; the update will cover FY05–18. By definition the RDA plan includes the funding lines of the RDTE and procurement appropriations only. The equipping PEG (EE PEG) develops and issues the RDA plan. The EE PEG is responsible for about 90 percent of the RDA program dollars and, also, for a limited number of non-RDA programs. To facilitate management of its total program, the EE PEG places the non-RDA funding streams of its MDEPs in the database of the RDA plan. The non-RDA funding streams are not part of the RDA plan; they are simply displayed in the RDA plan database. The non-RDA funding streams have no EPP.

11–86. TRADOC warfighting lens analysis (WFLA)

a. WFLA is the process that TRADOC executes to assess materiel battlefield capabilities and determine modernization alternatives for input to the Army's POM. WFLA is an interactive process among TRADOC's schools, proponents and HQDA staff. It compares the future required capabilities (and the associated DOTMLPF) of the total force against the fiscally constrained budgeted force in order to determine modernization needs. These needs are prioritized according to their relative value to mission accomplishment. Recommendations are then developed to address those shortfalls. WFLA answers three important questions:

- (1) How well do we do battlefield tasks?
- (2) How important is each battlefield task?
- (3) How important is a system to a task?

b. WFLA exists for two reasons: to provide materiel resourcing recommendations to HQDA and to support TRADOC's mission as "architect of the future Army". WFLA is the TRADOC vehicle for materiel resourcing recommendations to HQDA to ensure linkage with PPBES. TRADOC uses WFLA to provide input to the Army's RDA plan and POM considerations. It is derived from a warfighter's assessment of future battlefield requirements based on analysis of Army universal task list (AUTL) to identify critical warfighter deficiencies by evaluating how well the task is accomplished.

c. TRADOC provides WFLA recommendations to HQDA as key input for POM (December odd year) and, if needed, for mini-POM (December even year). WFLA is a living, evolving process and is initiated/updated each cycle through TRADOC implementation guidance developed to meet HQDA current year guidance.

11–87. Program stability.

Achieving early program objective consensus and following a good investment strategy will yield a stable program, clearly showing where we are today and where we want to be when we bring on the new system. To be successful, new systems acquisition programs must be developed and acquired in a timely and economical manner. Life-cycle cost estimates and changes to programs and schedules must be controlled. Changes to programs affecting established goals will be fully documented in the program management documentation, providing the justification for change (e.g., budget cut, design change). After entering system development and demonstration phase, design changes in system components meeting the approved requirement are discouraged and must be individually justified. The design should be frozen in sufficient time prior to DT and OT to provide an adequate system support package for testing. Changes to programs as a result of DT/OT must be of the "objective" nature to satisfy the requirement and not a "threshold" type of change, unless it can be demonstrated that the change will not have a significantly negative impact on the cost, schedule, producibility, and ILS aspects of the program.

Section V

Acquisition reform

11–88. Reform process

a. With a wide range of missions, global uncertainty, increased global technology transfer, and limited RDA resources, the Army has been a leader in acquisition reform. For example, the TRADOC battle labs and the AWEs have shown to be critical in simulating, experimenting, and assessing advanced technologies and concepts, thereby accelerating and improving both the requirement generation and acquisition processes. Every ATD is required to be sponsored by a TRADOC battle lab and have at least one experiment performed at a battle lab. The ACT II program, previously discussed, is funding competitively selected proposals from industry to demonstrate promising technology

and prototypes of keen interest to all the battle labs in satisfying priority FOCs. The OSD ACTD initiative allows rapid prototyping of promising technologies that provide real capabilities for the joint warfighting customer to evaluate.

b. A new partnership has been established among warfighter, Army acquisition, and industry organizations to identify technology options more quickly, establish the best technical approaches, conduct solid price-benefit trade studies, develop performance requirements, program the funding needed, and issue concise solicitations consistent with the foregoing. The battle labs, HTI ICTs, and team efforts are examples of the power of IPTs that bring stakeholders together to solve tough acquisition and requirements tasks concurrently and quickly. The Army continues to overcome organizational stovepipes and is mastering HTI and IT in a timely and affordable manner.

c. Another consideration in the acquisition reform process is how the Army deals with industry. Through performance specifications and streamlined, tailored, page-limited solicitations, the Army provides industry maximum flexibility by telling them what it wants as an end item and not how to do it or how to get there. Furthermore, the Army leverages commercial technologies, products, and processes and establishes open architectures that facilitate future upgrades, using to advantage the commercial IT revolution and rapid advances in computers. In addition, the Army requires a waiver before MIL SPEC/STD can be used in a request for proposal. These initiatives have shortened acquisition times for quality upgrades, reduced life-cycle costs, and allowed the acquisition community to readily integrate exciting new technologies, as efficiently and effectively as possible, as they become available. The rapid acquisition program for transformation (RAPT) program is one of the Army's primary streamlining processes.

11-89. Rapid acquisition program for transformation (RAPT)

The RAPT (previously referred to as warfighting rapid acquisition program (WRAP)) was established on April 11, 1996 primarily to accelerate fielding of systems and technology that emerge from TRADOC battle lab warfighting experiments. RAPT applies to AWEs, CEPs, ATDs, ACTDs and similar experiments where a TRADOC-led ICT supported by a TRADOC battle lab are directly involved. Normally, such systems and technology emerge from the experimentation process as unfinanced "new starts." If an approved new start cannot be acquired under existing MDA authorities and funding, the CG, TRADOC can initiate a RAPT ASARC to obtain approval of candidates based on compelling experimentation success and urgency of need. Supporting criteria include: technical merit and maturity, criticality and priority to warfighting requirements, affordability, effectiveness, supportability, and sustainability into the next Army POM. Successful RAPT candidates are ranked by priority and receive funding for operational prototypes in priority order. As of this update, the RAPT program is unfunded as a result of reprogramming actions to fund the Army's transformation strategy.

11-90. Horizontal technology integration (HTI)

a. The Army's requirements and modernization processes must be efficient, effective, and flexible in coping with the rapid changing technology and socio-political environments to provide the warfighter timely, innovative solutions providing or maintaining the edge in all missions. Today, the HTI program is one of the Army's primary modernization initiatives providing a holistic approach to requirements generation; early enjoinment of the requirements, acquisition, and user communities in a team effort; and aggressive exploitation of leading edge technologies.

b. HTI is the application of common enabling technologies across multiple systems to improve the overall warfighting capability of the force. It reduces R&D costs and development time by eliminating duplicate development efforts. It obtains lower unit production costs by procuring larger quantities of the same subsystem for different weapons systems. The Army also benefits from a common logistics base for the same subsystems on multiple platforms. Above all, HTI provides the warfighter with the necessary improvements in lethality, survivability, and tempo to defeat any threat on the 21st century battlefield. HTI depends upon the use of CBTDEV-led ICTs for horizontal requirements integration and MATDEV-led IPTs for program development and execution. HTI efforts may be applied within a single PEO, across multiple PEOs, or even across multiple services or departments. This section primarily describes the HQDA-level efforts that affect multiple PEOs.

c. HTI is implemented within the framework of existing acquisition processes, structures and organizations. A HQDA general officer working group (GOWG) is the central authority for all formal Army HTI initiatives and programs. The GOWG is co-chaired by the ODCS, G-8 Director, Force Development and the ASA(ALT) Deputy for Systems Management. GOWG members include representatives from HQDA (ODCS, G-3; ODCS, G-8; ASA(ALT); ASA(FM&C), CIO/G-6; ODCS G-4, etc.) along with other representatives (TRADOC, AMC, ATEC, etc.). They establish the HTI "blueprint", synchronize and prioritize efforts, provide specific guidance, resolve issues, and provide general officer-level direction, guidance, and oversight. In addition, the ASA(ALT) Deputy for Systems Management acts as the Army HTI executive agent and determines, coordinates, and issues specific guidance for HTI programs implemented across multiple PEO/PM structures and organizations.

d. The HTI process begins with an operational concept, FOC, or system requirement. The appropriate management structure is then chartered to implement an HTI initiative through the application of specific programs. HTI initiatives follow established acquisition management procedures. The ASA(ALT) ensures the technology insertion is completely synchronized through management oversight of the respective Army laboratory, Army RDECs, PEOs and PMs. The individual HTI efforts are managed as a part of planned STOs, new system developments, and/or system modifications. This increased management focus ensures the technology development plan or weapon system acquisition strategies/

plans are designed with an overall horizontal approach to development and execution. This includes possible joint service, allied nation or industry applications. HTI programs are resourced through individual MDEPs on a case-by-case basis. There is an MDEP established to provide funding for both common, government furnished hardware, and for the actual insertion and integration of the common hardware onto the designated weapon systems. As a process, HTI supports an integrated battlefield architecture that exploits the capabilities of combat, materiel and training developers, national laboratories, industry and academia to achieve total force synergism. Its purpose is to provide increased modernization efficiency and responsiveness while enhancing overall force warfighting effectiveness. As the HTI process matures, the need to create centralized funding lines, specific charters and requirements documents, along with creating specific task forces or PM organizations, are addressed.

e. There are some potential challenges or disadvantages to using an HTI acquisition approach. Linking multiple programs through common components or subsystems in order to achieve broad, multi-program benefits reduces individual program flexibility. Selecting the appropriate technology to be applied is a difficult choice since the technology must be mature enough (to guarantee both that it can be implemented by the programs and that it won't soon be surpassed) yet sufficiently new or innovative (to achieve the desired performance edge). Major modifications of certain older generation systems may also be required for those systems to accept newer technology. Additionally, funding the technology insertion for several different systems must be consistent and executable. To meet these challenges, HTI needs to be a basic part of program development and planning and applied broadly where it makes sense for total force efficiency and effectiveness. AR 70-1 provides more detailed information on HTI planning and execution.

11-91. Simulation and modeling for acquisition, requirements, and training (SMART)

a. SMART is an initiative to integrate M&S into Army business processes. Army SMART goals are to reduce the time required to field systems, reduce total ownership costs, and increase the military utility of fielded systems.

b. The SMART concept, first adopted by the Army in 1997, capitalizes on M&S tools and technologies to address system development, operational readiness, and life-cycle cost. This is accomplished through the collaborative efforts of the requirements, training and operations, and acquisition communities. Army Leadership has stated that the SMART initiative is a key mechanism to achieving the Army vision and building the Objective Force.

c. SMART is a framework to accomplish the vision of a disciplined, collaborative environment to reduce costs and time to provide solutions for Army needs. Early and persistent simulation support planning in an advanced collaborative environment (ACE) is a key means of inculcating SMART into our acquisition processes. Using M&S is one means of providing analytical agility in identifying operational concepts and architectures for time-phased requirements. Concurrently, using M&S in the acquisition management system can reduce costs, accelerate schedules, lower risk and improve quality of products. When the use of M&S in the requirements generation system and acquisition management system is integrated through early and persistent M&S support planning, the capabilities set in place accelerate the translation of time-phased requirements into evolutionary acquisition strategies. SMART will yield four significant benefits that are key to Army Transformation:

- (1) Reduced total ownership costs and sustainment burden for fielded systems throughout their service lives.
- (2) Reduced time required for concept exploration, concept development, and fielding new or upgraded systems.
- (3) Increased military worth of fielded systems while simultaneously optimizing force structure, doctrine, tactics, techniques and procedures.
- (4) Concurrent fielding of systems with their system and non-system training devices.

d. Concept. SMART leverages IT to improve the processes that will lead to Army modernization and a fully mission ready Objective Force. The ultimate end state is to enable advanced collaboration leading to more rapid fielding of the Objective Force by conducting these activities almost entirely in a digital environment.

(1) For example, picture the traditional "clay model" as a digital model. Instead of using "clay" to enable collaboration and "what-if" analysis by all stakeholders "in the room", we now use "electrons" to enable collaboration by a universe of stakeholders — limited only by their ability to gain access to the Internet. The most effective "what if" analysis is done while the model is still in the computer. We must use M&S to discover "the better mousetrap" before "bending metal". That's how you get a better product, at lower cost, and in less time. M&S is key to making SMART work, but the value of SMART increases exponentially as we leverage existing information technologies to provide ALL stakeholders with early opportunities to collaborate.

(2) Greater reliance will be placed on IT tools to develop DOTMLPF solutions. Under SMART, full analysis of non-materiel solutions to address a new requirement is more easily achieved. M&S tools combine with emerging information technologies to enable a collaborative environment where changes in doctrine, organizational structure, training, leadership, personnel and facilities can be fully developed and assessed. When as a last resort a materiel solution is called for, the advanced collaborative environment supports use of these same capabilities to determine, design, test, evaluate, demonstrate and train on a hardware or software solution to satisfy all requirements from a holistic perspective.

(3) SMART is the key. Timely fielding of the Objective Force means we must cut traditional acquisition times in

half. Success in reducing systems acquisition times by more than 50% in this decade, is directly tied to our success in making SMART the way the Army does business.

e. SMART does not eliminate all live activities associated with system development, testing, and operation. SMART gains the maximum effectiveness and efficiency in system design, development, fielding, maintenance, and testing through efficient human interface with IT across the domains of training, analysis and acquisition. To accomplish all of the system development life cycle solely with computer-based models requires significant maturation of the mathematics and statistics that apply to the use of models, as well as considerable advancement in our ability to describe and reason about nonlinear systems. Gaining such technological ability does not imply abandoning contact with reality. Real systems will continue to be tested and soldiers will continue to conduct live training. Such live activities, however, will be conducted having benefited from the insights, efficiencies, and cost effectiveness of advanced computer based activities. Likewise, computer based activities should leverage the realism and insight that comes from live activities: this would constantly improve the fidelity of computer based models and algorithms

f. Enablers. SMART is enabled by more than just M&S. Successful execution of SMART requires many different enablers such as:

- (1) Supportive processes, policies, and laws.
- (2) Means to identify, obtain and protect reusable resources.
- (3) Data interchange standards to foster consistent understanding of shared information.
- (4) Standards for software interoperability.
- (5) Standards for credible verification and validation of M&S.
- (6) M&S that validly represents the relevant entities, attributes and interactions, including performance of human decision makers and operators.
- (7) Tools and methods based on emerging information and other technologies to support and better manage cross-domain collaboration.
- (8) Competent and motivated professionals
- (9) Leadership commitment and support at all levels.
- (10) Data management.

g. SMART is not just for the acquisition community. SMART is just as relevant for the soldier in the field, as it is for the PM. Addressing system development, ownership costs, and training to modernize more quickly, effectively, and affordably, is not possible through the efforts of the acquisition workforce alone. It requires the up-front and continued collaboration among the combat, materiel, and training development communities. To influence Army Transformation, the Army Model and Simulation Office (an ODCS, G-3 Directorate) implemented the SMART Execution Plan in FY 2001. Those who generate the requirements, write the doctrine, and train on embedded training systems, will then be relied upon to operate and fight with the new systems of the Objective Force, and must sustain these systems after they are fielded. All are stakeholders who will benefit by making SMART a part of the way the Army does business.

h. SMART is the process that the Army will use to harness the power of the digital information age. Through M&S, combined with emerging information and other technologies, the Army will gain the electronic agility that has never been available. The Army can now visualize the effectiveness of a system as it develops its requirements. SMART offers the Army an effective means of engaging the soldier directly in the acquisition process. The Army can now develop insights into whether equipment designs need to be modified or changes in tactics are necessary, or both. The application of SMART will have a major impact on future Army capabilities and will indeed enable more rapid fielding of the Objective Force.

Section VI

Summary and references

11–92. Summary.

a. This chapter provided a basic introduction to the management process, organization, and structure of RDA. Through the chapter description, the reader should have gained an appreciation of the logic of the process, its organization and management including recent changes. This chapter also highlights the current basic policies for materiel acquisition, recently updated DOD and Army policies for materiel systems, the Army's acquisition objectives, and descriptions of acquisition managers.

b. Difficult decisions, a scarcity of dollar resources, and honest differences of opinion cause disruptions and delays. It is unlikely that there will be total agreement on the best technical approach to satisfy a need—or, indeed, on the need itself. The annual budget cycle and budget constraints almost ensure that some projects will not be funded at the level desired—if at all. Tests are not always successful. Estimates of time, costs, effectiveness, and technical feasibility are often wide of the mark for complex systems. After all, they are estimates that are projected well into the future based on sketchy data. These real-world problems reinforce the fact that RDA management is a complex task of great importance to national defense. RDA can be a wellspring of new and effective weapons systems where effective management and professionalism can make the difference on any future battlefield. As with any activity involving the

use of scarce resources to meet organizational goals and objectives, the people involved—the acquisition managers and the soldier users and maintainers—constitute the most vital link to mission accomplishment.

11–93. References.

- a. *Federal Acquisition Streamlining Act of 1994*, 13 October 1994.
- b. *The Defense Acquisition Workforce Improvement Act (DAWIA)*, Title 10 USC Sections 1701–1764, *Defense Acquisition Workforce Improvement Act of 1990, as amended by Section 808, Public Law (PL) No. 106–398, National Defense Authorization Act for Fiscal Year 2001, October 30, 2000: Section 824, PL No. 107–107, December 28, 2001*; and as may be subsequently amended by future statutory changes.
- c. DOD Directive 5000.1, *The Defense Acquisition System*, 30 October 2002.
- d. DOD Directive 5000.52, *Defense Acquisition Education, Training and Career Development Program*, 25 October 1991.
- e. DOD Instruction 5000.2, *Operation of the Defense Acquisition System*, 30 October 2002.
- f. *DOD 5000 Resource Center Guidebook*, supporting discretionary, best practices, lessons learned, and expectations, <http://DOD5000.dau.mil>
- g. Chief of Staff, Army Memorandum, *Approval of Army Warfighting Requirements*, 19 March 2001.
- h. *DOD Science and Technology Strategy*, May 2000.
- i. *2001 DOD Basic Research Plan (BRP)*, April 2001.
- j. *2001 DOD Technology Area Plan*, April 2001.
- k. *2002 DOD Joint Warfighting Science and Technology Plan*, February 2002.
- l. *2002 DOD Defense Technology Objectives of the JWSTP and DTAP*, February 2002.
- m. *Defense Acquisition Deskbook*, Software Version 3.8, 22 March 2002.
- n. Defense Systems Management College, *Introduction to Defense Acquisition Management* June 1996.
- o. Deputy Secretary of Defense Memorandum, *Elimination of the Major Automated Information System Review Council*, 28 July 1998.
- p. CJCSI 3170.01B, *Requirements Generation System*, 15 April 2001.
- q. CJCSI 6212.01B, *Interoperability and Supportability of National Security Systems, and Information Technology Systems*, 14 May 2000.
- r. Assistant Secretary of the Army (Acquisition, Logistics, and Technology), *Life-Cycle Management - Program Restructuring*, 26 October 2001.
- s. Army Regulation 70–1, *Army Acquisition Policy*, 15 December 1997.
- t. Army Regulation 70–75, *Survivability of Army Personnel and Materiel*, 10 January 1995.
- u. Army Regulation 71–9, *Materiel Requirements*, 30 April 1997.
- v. Army Regulation 73–1, *Test and Evaluation Policy*, 7 January 2002.
- w. Army Regulation 602–2, *Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process*, 1 June 2001.
- x. Army Regulation 700–127, *Integrated Logistics Support*, 10 November 2001.
- y. DA Pamphlet 70–3, *Army Acquisition Procedures*, 15 July 1999.
- z. DA Pamphlet 73–1, *Test and Evaluation in Support of System Acquisition*.
- aa. Secretary of the Army Memorandum, *Transfer of Logistics Functions*, 16 February 1999.
- bb. Assistant Secretary of the Army (Research, Development and Acquisition) Memorandum, *Fast Track Acquisition Policy*, 30 June 1997.
- cc. Assistant Secretary of the Army (Acquisition, Logistics, and Technology), *1999 Development, Acquisition, and Fielding Strategy*.
- dd. Assistant Secretary of the Army (Research, Development, and Acquisition) Memorandum, *Elimination of the Major Automated Information System Review Council*, 8 September 1998.
- ee. Office, Chief of Staff, *Army Vision Statement*, 12 October 1999.
- ff. *FY 01 Army Science and Technology Master Plan*, Vols. I and II, 18 May 2001.
- gg. *The United States Army 2002 Modernization Plan*, February 2002.
- hh. *The Army Systems Survivability Strategy*, December 1996.
- ii. Army Information Paper, *Army XXI Acquisition Reform Reinvention Laboratory*, 10 June 1995.
- jj. TRADOC Pamphlet 71–9, *Requirements Generation*, 5 November 1999.
- kk. TRADOC Pamphlet 525–66 (Final Draft), *Force Operating Capability*, 6 September 2002.
- ll. TRADOC Pamphlet 525–3–0, *Capstone Concept (Final Draft)*, February 2002.
- mm. U.S. Army Materiel Command Pamphlet 70–2, *Integrated Product and Process Management*.
- nn. Deputy Chief of Staff for Operations and Plans Memorandum, *Approval of Army Warfighting Requirements - Interim Implementation Guidance*, 12 April 2001.

- oo. Chief of Staff, Army Memorandum, *Program Executive Officer/Project Manager (PEO/PM) Reorganization - ACTION MEMORANDUM*, undated.
- pp. TRADOC Regulation 71-12, *TRADOC System Management*, 1 March 2002.
- qq. General Orders #3, *Assignment of Functions and Responsibilities within Headquarters, Department of the Army*, 9 July 2002.
- rr. Deputy Undersecretary Defense (Acquisition, Technology, Logistics) Memorandum, *Evolutionary Acquisition and Spiral Development*, 12 April 2002.
- ss. Joint Staff Memorandum, *Changes to the Requirements Generation System*, 7 October 2002.
- tt. DOD Directive 4630.5, *Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)*, 11 January 2002.
- uu. CJCSI 3180.01, *Joint Requirements Oversight Council (JROC) Programmatic Process for Joint Experimentation and Joint Resource Change Recommendations*, 31 October 2002.
- vv. TRADOC Memorandum, *FY 03 Developments Guidance*, 25 November 2002.